322

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CONTENTS

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PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 4 IN SET 299

Emerson Models 1102D, F, 1104F, H, J, L, 1105D, 1106H, J, L, N, P, R, 1107D, F, 1114D, F, H, L, 1115D, 1128F, 1130D, F, 1132F, 1142D and 1143D were covered in Photofact Folder 4 – Set 299.

Following is a list of new models and chassis, which are being added with the publication of this bulletin.

MODEL	CHASSIS	PICTURE TUBE	TUNER
1102	120245-Z	17LP4	470893
1103	120289-R	17LP4	470864
1118	120255-V	21AUP4A	470894
1119	120269-R	21AUP4A	470826
1143	120276-R	21AUP4A	470826
1148	120259-V	21AUP4A	470894
1149	120276-R	21AUP4A	470826
1166	120259-P	21AUP4A	470824
1170	120255-P	21AUP4A	470824
1172	120259-P	21AUP4A	470824
1182	120259-P	21AUP4A	470824
1183	120276-R	21AUP4A	470826
1184	120259-P	21AUP4A	470824
1185	120276-R	21AUP4A	470826

TUNER IDENTIFICATION

The above models are electrically similar to the models originally covered, except for different tuners being incorporated.

Chassis 120245-Z is similar to chassis 120245-D, except tuner #470893 is used. A schematic of this tuner is given in Fig. 1.

Chassis 120255-P and 120259-P are similar to chassis 120255-D, except tuner #470824 is used. A schematic of this tuner is given in Fig. 2.

Chassis 120255-V and 120259-V are similar to chassis 120255-D, except tuner #470894 is used. A schematic of this tuner is given in Fig. 3.

Chassis 120269-R, 120276-R and 120289-R are similar to chassis 120269-L, except tuner #470826 and 470864 are used. A schematic of these tuners are shown in Fig. 4.

WIDTH CONTROL ADDED

After production started on chassis covered by this bulletin, an aluminum shim type width control was added. This aluminum shim (part #412302, $2\frac{1}{2}$" x 6") is wrapped around the neck of the picture tube.

To eliminate the possibility of the aluminum shim shorting to the yoke windings, the deflection yoke (T3) is changed to part #708270. The deflection yoke #708270 is identical to #708214, except for the addition of an insulated sleeve.

EMERSON MODELS 1102, 1103, 1118, 1119, 1143, 1148, 1149, 1166, 1170, 1172, 1182, 1183, 1184, 1185(Ch. 120245-Z, 120255-P, -V, 120259-P, -V, 120269-R, 120276-R, 120289-R)

PRODUCTION CHANGES
BULLETIN 159

PRODUCTION CHANGES
BULLETIN 159

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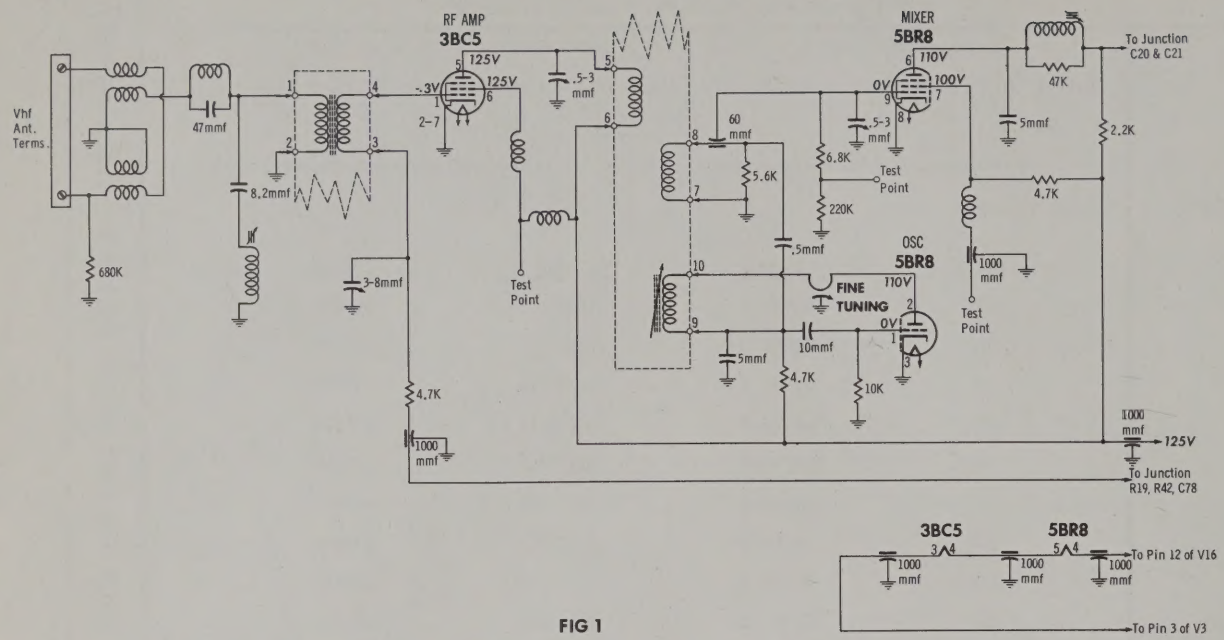
RF AMP
3BC5
MIXER
5BR8
OSC
5BR8
Vhf
Ant.
Terms.
47mmf
8.2mmf
3-8mmf
680K
4.7K
1000
mmf
.5-3
mmf
60
mmf
6.8K
5.6K
220K
Test
Point
.5mmf
10mmf
4.7K
10K
FINE
TUNING
1000
mmf
47K
5mmf
2.2K
4.7K
To Junction
C20 & C21
125V
To Junction
R19, R42, C78
3BC5
5BR8
To Pin 12 of V16
To Pin 3 of V3

FIG 1

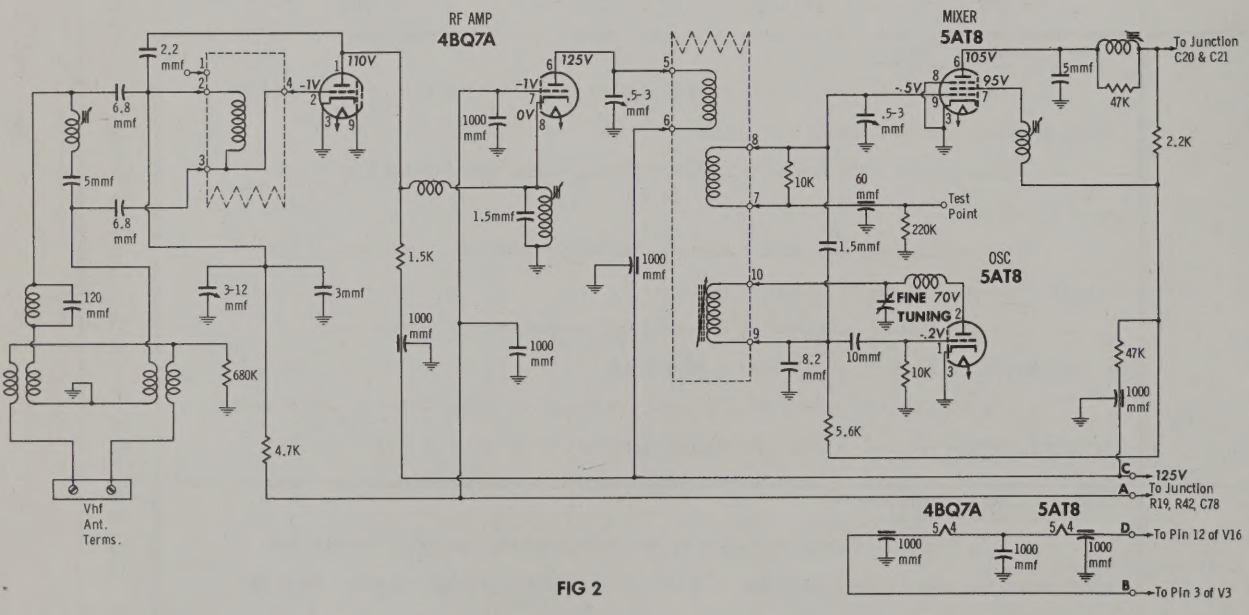
RF AMP
4BQ7A
MIXER
5AT8
OSC
5AT8
2.2
mmf
6.8
mmf
5mmf
120
mmf
3-12
mmf
3mmf
680K
4.7K
Vhf
Ant.
Terms.
1.5K
1000
mmf
1.5mmf
.5-3
mmf
10K
60
mmf
220K
Test
Point
8.2
mmf
10mmf
5.6K
FINE
TUNING
47K
2.2K
5mmf
To Junction
C20 & C21
125V
To Junction
R19, R42, C78
4BQ7A
5AT8
To Pin 12 of V16
To Pin 3 of V3

FIG 2

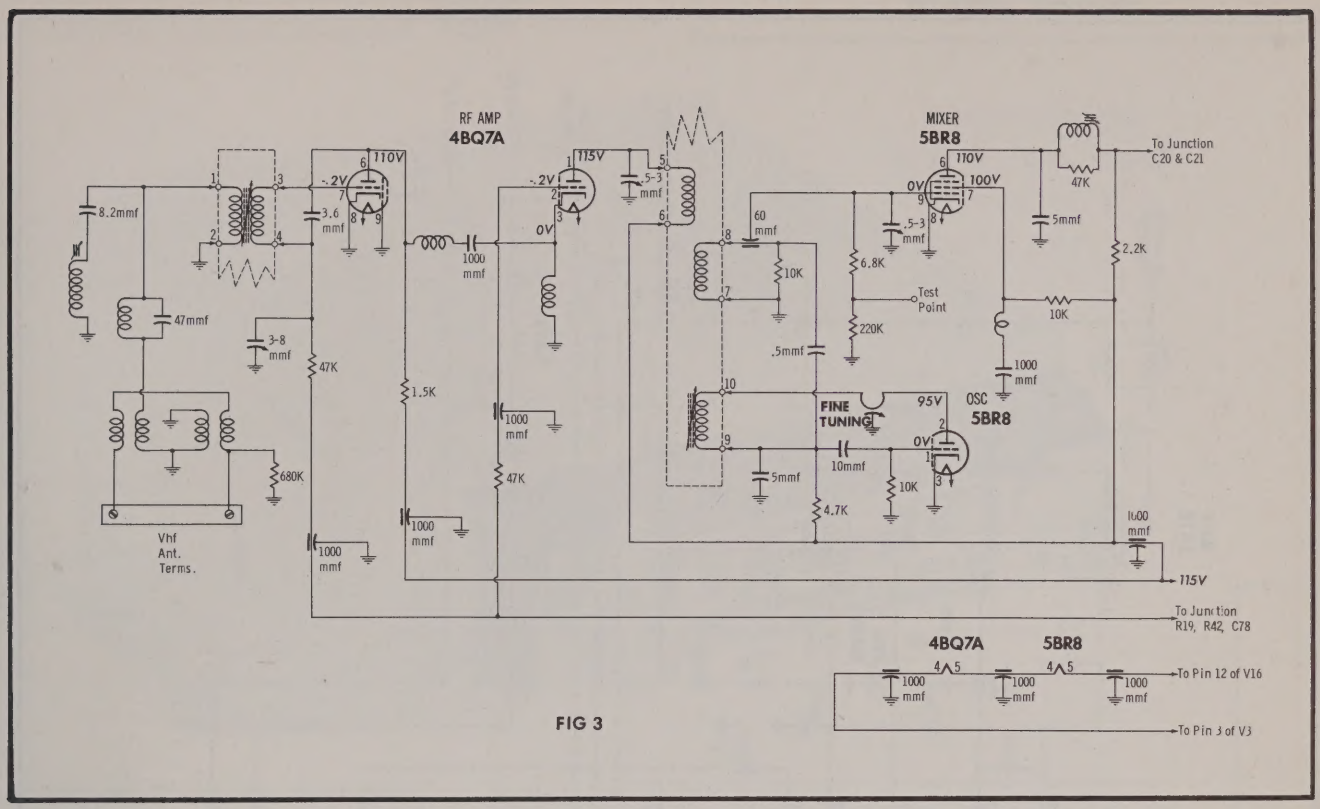
RF AMP
4BQ7A
MIXER
5BR8
OSC
5BR8
FINE TUNING
Test Point
Vhf Ant. Terms.
To Junction C20 & C21
To Junction R19, R42, C78
115V
4BQ7A
5BR8
To Pin 12 of V16
To Pin 3 of V3
8.2mmf
47mmf
3-8 mmf
3.6 mmf
47K
680K
1.5K
1000 mmf
60 mmf
10K
6.8K
220K
.5mmf
5mmf
10mmf
4.7K
.5-3 mmf
2.2K

FIG 3

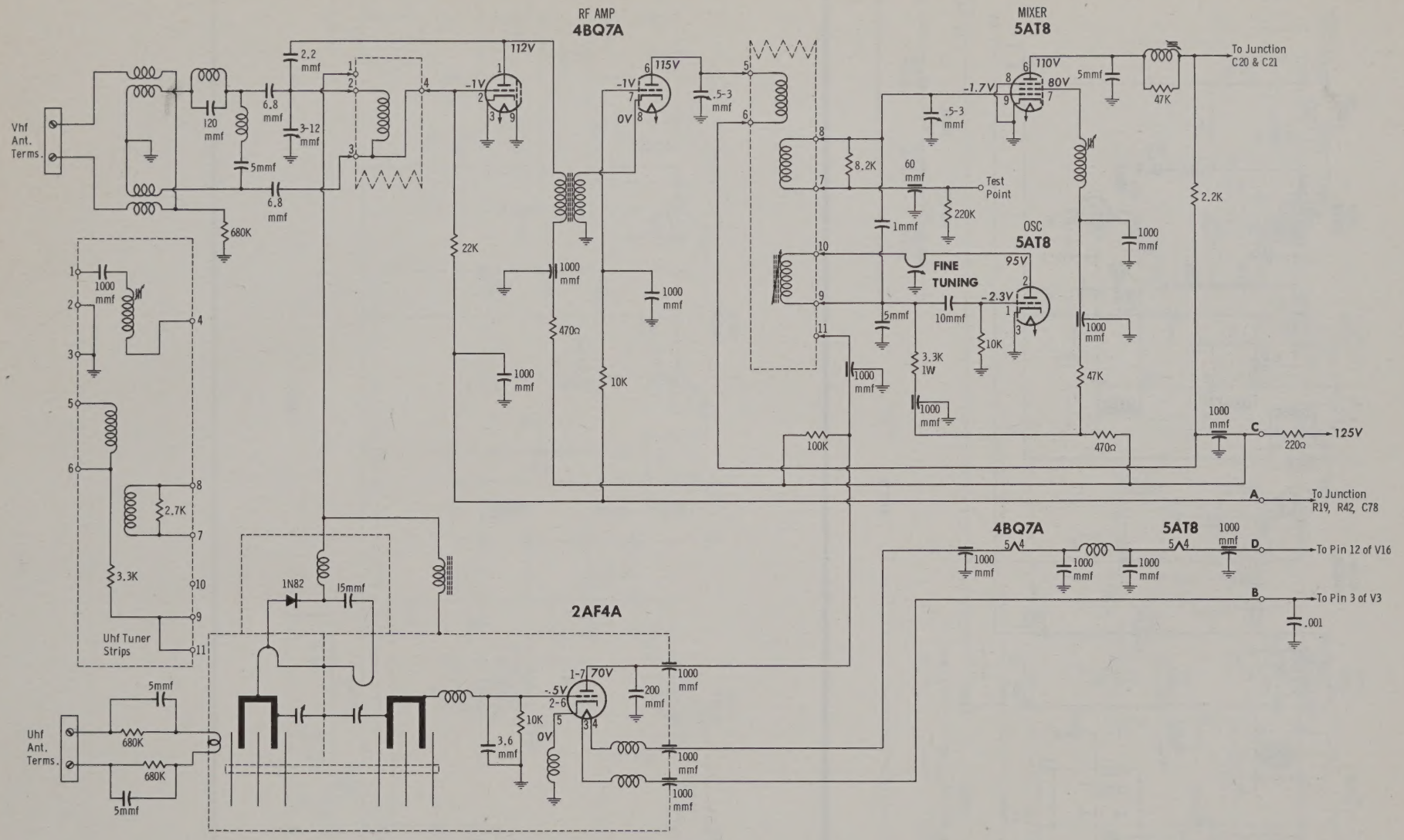
RF AMP
4BQ7A
MIXER
5AT8
OSC
5AT8
2AF4A
4BQ7A
5AT8
Vhf Ant. Terms.
Uhf Ant. Terms.
Uhf Tuner Strips
FINE TUNING
Test Point
To Junction C20 & C21
To Junction R19, R42, C78
To Pin 12 of V16
To Pin 3 of V3
125V
112V
115V
110V
95V
80V
70V
0V
-1V
-1.7V
-2.3V
-.5V
2.2 mmf
6.8 mmf
120 mmf
3-12 mmf
5mmf
680K
22K
1000 mmf
470Ω
10K
.5-3 mmf
8.2K
60 mmf
220K
1mmf
10mmf
3.3K 1W
100K
47K
220Ω
2.2K
2.7K
3.3K
1N82
15mmf
200 mmf
3.6 mmf
.001

FIG 4

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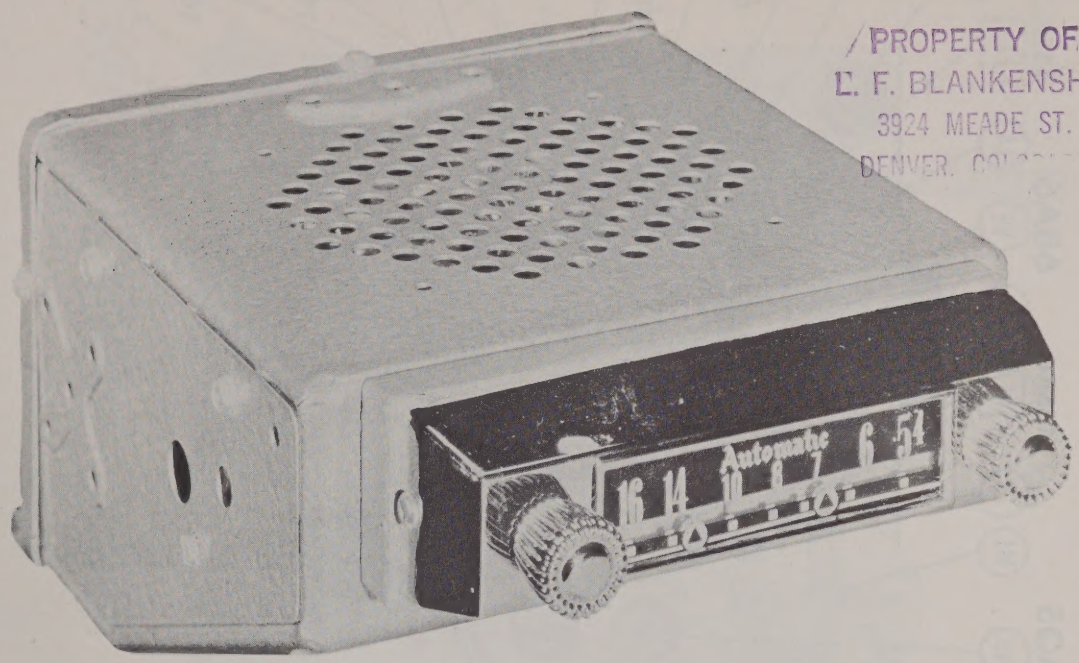


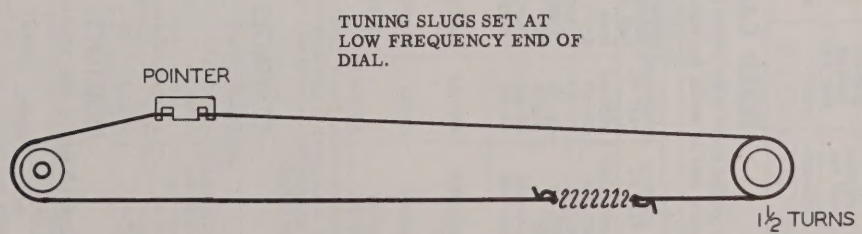
TRADE NAME	Automatic Model MU34
MANUFACTURER	Automatic Radio Mfg. Co., Inc., 122 Brookline Ave., Boston 15, Mass.
TYPE SET	Battery Operated AM Superheterodyne Universal Type Automobile Receiver
TUBES (Six)	Types 6BA6 RF Amplifier, 6BE6 Converter, 6BA6 IF Amplifier, 6AV6 (or) 6AT6 Det.-AVC-AF Amp., 6AQ5 Output, 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 5.7 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	538KC-1610KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400~Mod)	1610KC	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1610KC	"	"	A5	"
3.	68MMF	Antenna lead	1400KC	Tune to 1400KC signal	"	A6, A7	"

With receiver installed in car and antenna fully extended, adjust A7 for maximum volume.



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PARTS LIST AND DESCRIPTIONS

AUTOMATIC
Model MU34

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BA6	
V2	Converter	6BE6	
V3	IF Amplifier	6BA6	

ITEM No.	USE	TYPE	NOTES
V4	Det.-AVC-AF Amplifier	6AV6	Note 1
V5	Output	6AQ5	
V6	Rectifier	6X4	

Note 1. 6AT6 may be used as an alternate.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	AUTOMATIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■20	350	CE-86	AFH3-107	C080	FP345.8	TMT92	T-470	TVL-3634
B	▲20	350							
C	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	AUTOMATIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	100		CC101	N750-D100	TCN-100	N042	N750L-101	NT-531	5TCU-T1	
C3	5000		C502-4	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C4	.047	200	C503-2	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C5	.047	200	C503-2	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C6	5		CC5	SI5	D6-050	G011	GP1K-050	ZT-555	5GA-V5	
C7	40		CC400	NP0-SI39	D6-400	Z031	831-390	MCB223	5TCC-Q39	
C8	200			1469-0002	D6-200	5R5T2	811-201	MCB237	MS-32	Note 1
C9A	220									
B	5000									
C	5000		♦	♦PA-113-2	♦PC-151	♦116TM2	♦1408-02		♦DT-2	
D	250									
E										
C10	.01	600	CC103-6	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C11	6000	2000							20HK-D6	Note 2
C12	.47	100	C474-1	VHC36		MP2P5		RF480	68P20	
C13	800		CC801	EF-001	MFT-1000				503C-D1	

Note 1. Some versions may use 270MMF in this application (part #CC271).
Note 2. Some versions may use 8000MMF in this application (part #C802-16).
♦ Items C9A, C9B, C9C, C9D, C9E, R9A, R9B and R9C are combined in one unit. When replacing items separately C9D and C9E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AUTOMATIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½	RV-57C	AB-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-4	SWE-13	76-1	US-26	Attach to R1A

RESISTORS

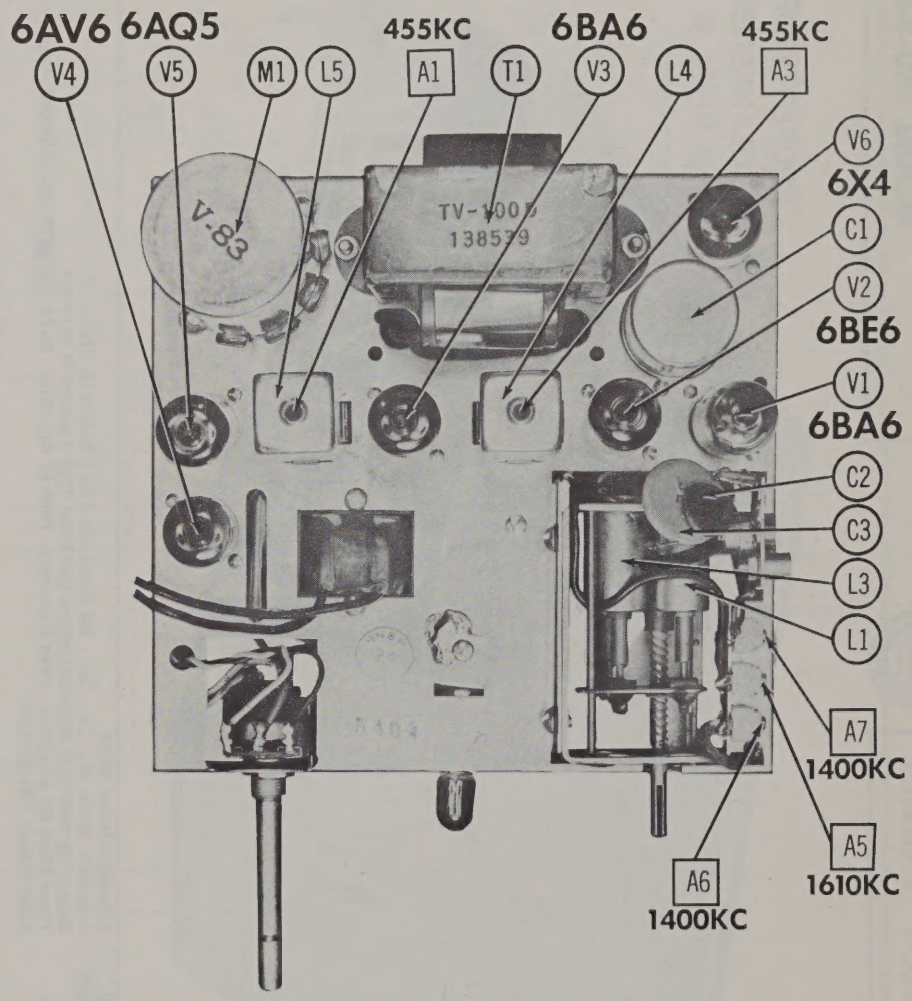
All wattages 1/2 watt, or less, unless listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AUTOMATIC PART No.	IRC PART No.	
R2	470KΩ		R474	BTS-470K	
R3	150Ω			BTS-150	Note 1
R4	150KΩ		R154	BTS-150K	
R5	47KΩ		R473	BTS-47K	
R6	6800Ω	2	R682-2	BTB-6800	
R7	820Ω		R821	BTS-820	
R8	2.2Meg		R225	BTS-2.2Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AUTOMATIC PART No.	IRC PART No.	
R9A	6.8Meg			BTS-6.8Meg	
B	470KΩ		♦	BTS-470K	
C	470KΩ			BTS-470K	
R10	330Ω		R331	BTS-330	
R11	1000Ω	1	R102-1	BTA-1000	
R12	68Ω			BTS-68	Note 2
R13	68Ω			BTS-68	Note 2

♦ Items R9A, R9B, R9C, C9A, C9B, C9C, C9D, C9E are combined in one unit.
Note 1. Some versions use a 220Ω, ½ watt resistor in this application (Mfgr. part #R221).
Note 2. Some versions use a 82Ω, ½ watt resistor in this application (Mfgr. part #R820).

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	6.3VCT @2.2A	480VCT @.048A			TV-100D	V3801	P2970	P6476 ①		V-16K ①

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AUTOMATIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5KΩ	3-4Ω	TO4502P						

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	AUTOMATIC PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5"	PM	3-4Ω	PM263	5A07	205S2	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	AUTOMATIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1Ω						Note 1
L2	RF Coil	1Ω						Note 1
L3	Osc. Coil	.5Ω	4.8Ω					Note 1
L4	Input IF	13Ω	13Ω	1655-6	16-6758	BC-352	12-C1	
L5	Output IF	13Ω	13Ω	1655-6	16-6758	BC-353	12-C2	
L6	Vib. Hash Choke	0Ω		L202				

Note 1. Part of complete assembly part #PT-555.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA				NOTES
				AUTOMATIC PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6VDC	115∿	V83	5301	859	5301	

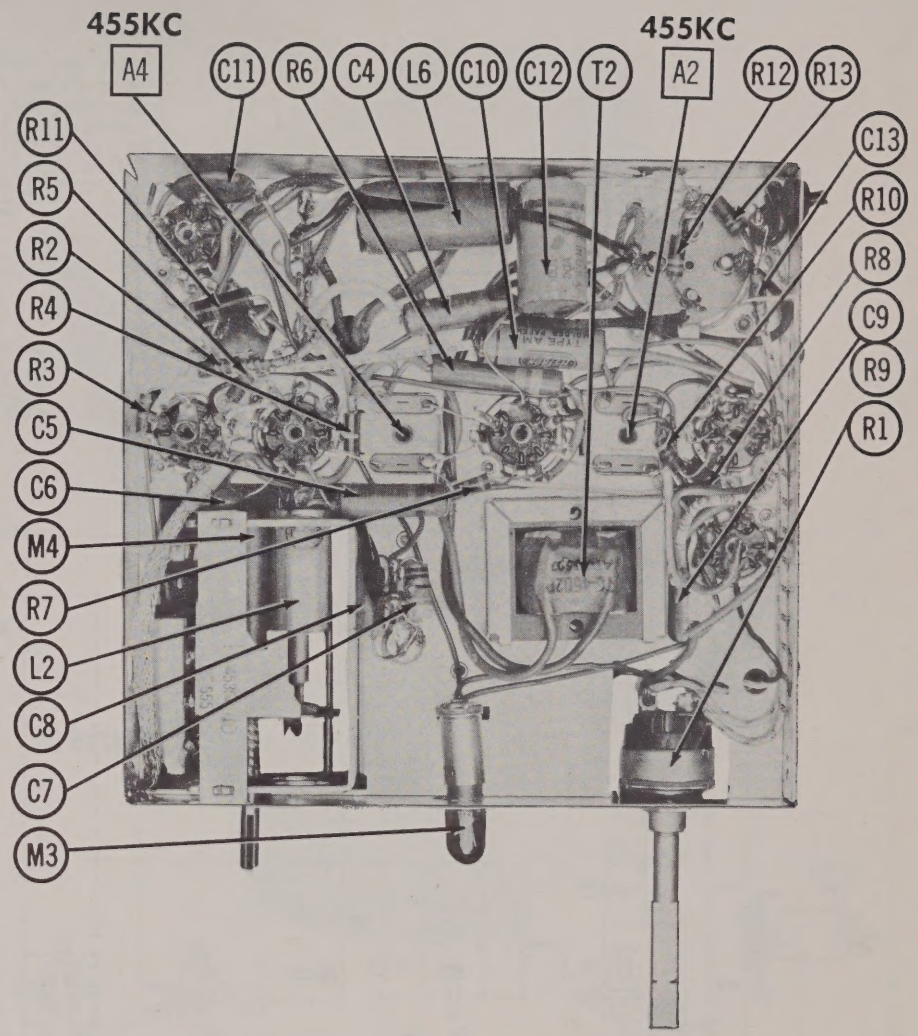
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			AUTOMATIC PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	14A	A200		307014. (SFE14A)	155014	SFE14	HRI

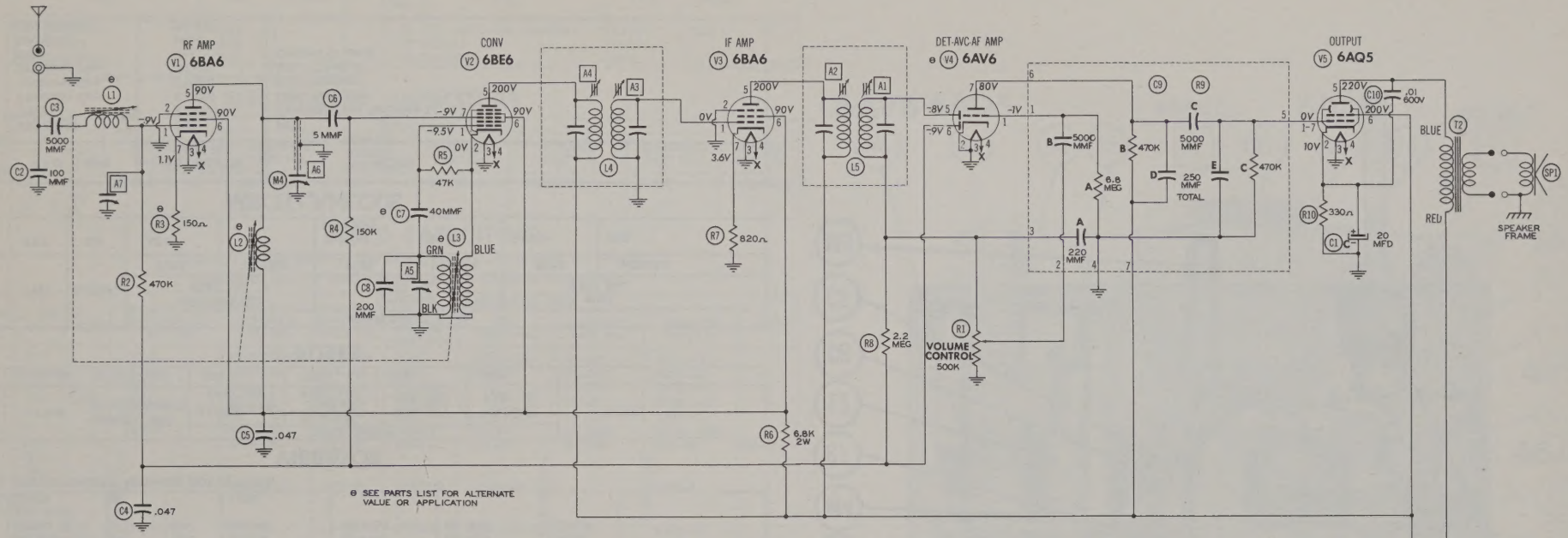
MISCELLANEOUS

ITEM No.	PART NAME	AUTOMATIC PART No.	NOTES
M3	Dial Light	T47	#47
M4	Tuner	PT-555	Permeability; includes L1, L2, L3
A5	Trimmer Cap.	CT-161	Osc. Trimmer
A6	Trimmer Cap.	CT-161	RF Trimmer
A7	Trimmer Cap.	CT-161	Ant. Trimmer
	Knob	H38	Control (2 used)
	Dial Scale	D-34	
	Dial Pointer	PS-34	

CHASSIS—BOTTOM VIEW

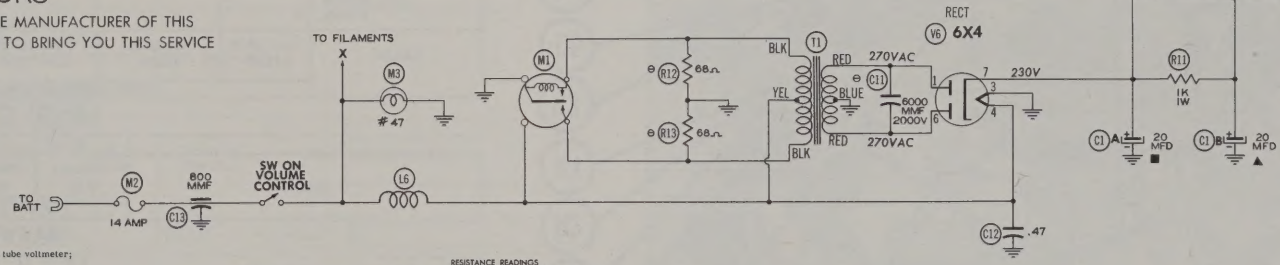


AUTOMATIC Model MU34



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6.3 volts for voltage readings.
5. Nominal tolerance on components values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	3.2Meg	0Ω	0Ω	3Ω	† 7.8KΩ	† 7.8KΩ	150Ω
V 2	6BE6	47KΩ	.5Ω	0Ω	3Ω	† 1KΩ	† 7.8KΩ	2.8Meg
V 3	6BA6	15Ω	0Ω	0Ω	3Ω	† 1KΩ	† 7.8KΩ	820Ω
V 4	6AV6	6.8Meg	0Ω	0Ω	3Ω	500KΩ	2.7Meg	† 470KΩ
V 5	6AQ5	470KΩ	330Ω	0Ω	3Ω	† 350Ω	† 1KΩ	470KΩ
V 6	6X4	400Ω	NC	3Ω	0Ω	NC	400Ω	50KΩ

† MEASURED FROM PIN 7 OF V6.
NC-NO CONNECTION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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[illegible] ST.
[illegible] COLORADO

COLUMBIA
MODEL 462

Figure 1

GENERAL INFORMATION

The Columbia Model 462 Tape Recorder is designed to record and playback two tracks of material on standard width recording tape, which doubles the playing time of a reel of tape with with no loss of frequency response or quality. Recordings can be made from a radio, television receiver or phonograph, in addition to those made directly from the microphone. Recordings can be played back through the self-contained speakers or an external speaker through use of the output jack.

Model 462 is designed for two tape speeds, 3 3/4" and 7 1/2" per second. Using both tracks of the tape the recording time is as follows:

Size Reel	3 3/4" Speed	7 1/2" Speed
5" reel (600 ft.)	1 hour	1/2 hour
7" reel (1200 ft.)	2 hours	1 hour

This unit is designed to operate on 60 cycle, 115 volts, AC supply only. Before connecting to your line supply, be absolutely certain that it agrees with the above specifications.

Manufactured by:

Columbia Records
799 Seventh Avenue
New York, N. Y.

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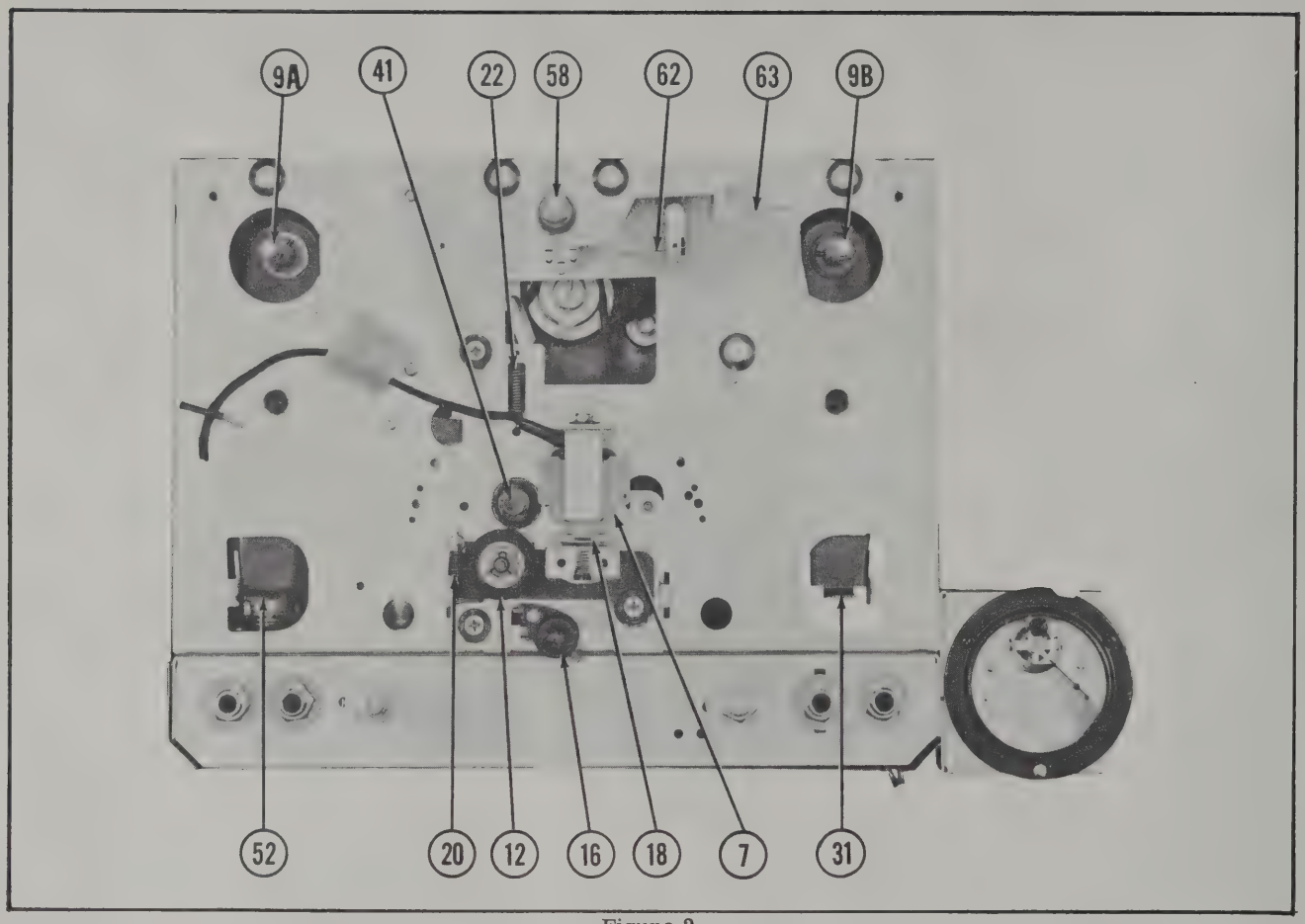

Figure 2

SPECIFICATIONS

Controls: On-Off Tone, Volume, Record-Playback, Fast Forward, Fast Rewind.

Tubes: 12AU7A, 12AX7, 6C4, 6V6GT, 6X5.

Frequency Response: 65 to 10,000 cycle per second.

Power Requirements: 110-120 volts - 60 cycle A.C. only, 70 watts.

Power Output: 2 watts undistorted - 3 watts maximum.

Inputs: Mike - 1 Meg. Imp., Radio - Phono. 5 Meg. Imp.

Output: Int. 5" Speakers, Ext. 3.2Ω Speaker, Ext. 1 Meg. Imp. for Ext. Amp. or Monitor in record.

Bias & Erase Frequency: 50KC.

OPERATING INSTRUCTIONS

Threading The Tape-

1. Place a reel of tape on the right reel plate (2A) and an empty reel on the left reel plate (2B) making sure the reel slots engage the pins on the reel plates.

2. Unwind about 10" of tape from the reel. Hold a section of the tape straight with both hands and insert the tape in the tape slot making sure the dull coated side faces the rear of the recorder.

3. Insert the free end of the tape into one of the three radial slots in the hub of the empty reel. Turn the reel several turns, clockwise, until the tape is secured to the reel and all slack is taken up between reels.

To Record From Microphone-

1. Turn the On-Off Tone Control clockwise until a click is heard and allow about thirty seconds for the tubes to warm up.

2. Insert the microphone plug into the "Mike" jack.

3. Depress the play-record control knob (3) as far as it will go, turn clockwise until it locks while holding it down.

4. Hold the microphone about six inches from your mouth and speak in a normal voice. Adjust the "Volume" control until the record level meter pointer on the meter fluctuates only within the range between the numbers zero and minus twenty. The pointer should not enter the area above zero, nor the area below minus twenty on the scale during recording.

NOTE: Correct recording volume is very important. Too weak a signal, which does not cause the record level meter to fluctuate, will result in weak playback and high background noise. Too strong a signal, causing the level meter to go out of the range, will result in distortion during playback.

To Record From Radio-

Recordings from a radio may be made by one of three ways:

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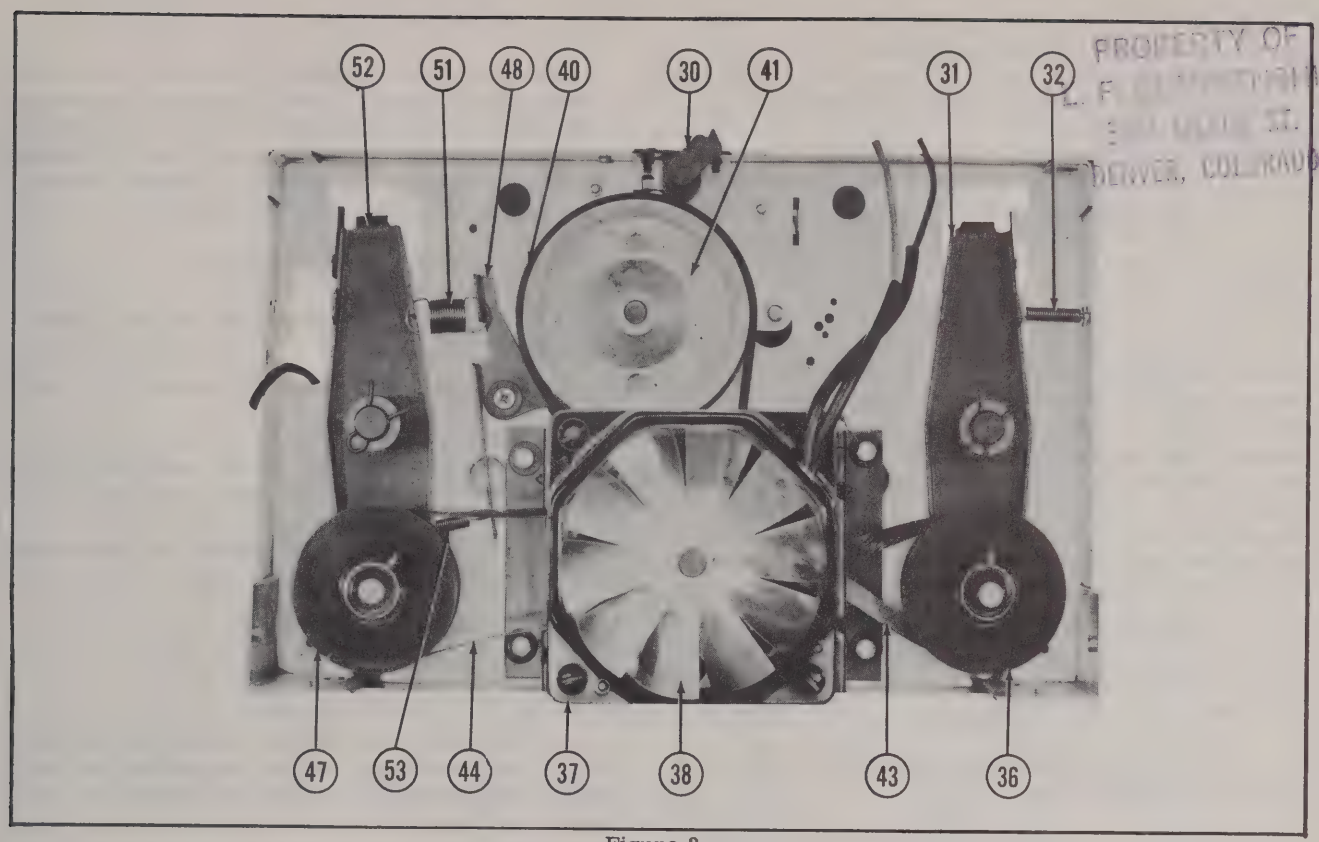


Figure 3

1. Place the microphone about 6" to 12" in front of the radio speaker. Turn the radio volume control to a normal level. Setting it too high will cause distortion. Turn the radio tone control to maximum treble. Set the recording level and proceed with recording as described under "To Record From Microphone". This type of recording may not be satisfactory as other sounds may be picked up by the microphone which as a result will be recorded on the tape.

2. Have a shielded cable made up with a two conductor phone plug on one end and two alligator clips on the other end. Connect the alligator clips across the voice coil terminals on the radio speaker and insert the cord plug into the "Radio-Phono" jack. Set the radio volume and tone controls as described above. Set the recording level and proceed as described under "To Record From Microphone".

3. Have a shielded cable with a two conductor phone plug on one end and the other end connected across the radio volume control. Insert the phone plug into the "Radio-Phono" jack. Set the recording level and proceed with the recording as described under "To Record From Microphone." The position of the radio volume and tone controls has no effect on this setup and may be set anywhere.

To Record From Phonograph-

1. If the phonograph being used has a phone type plug on the pickup leads, insert it into the "Radio-Phono" jack. Set the recording level and proceed with the recording as described under "To Record From Microphone".

2. If the phonograph has a standard pin type plug which is more common, an adaptor is needed. Insert the pin plug into the adaptor and plug the adaptor into the "Radio-Phono" jack.

To Record From Television Receiver-

1. Use one of the three methods described under "To Record From Radio" and proceed with the recording as described under "To Record From Microphone".

Dual Track Recording-

The Columbia is designed so that only one-half the tape width is recorded at a time; thereby resulting in two track recording. This two track operation is accomplished in the following manner:

1. After a reel of tape has been recorded, i.e. all of the tape wound on to the tape-up reel, turn the play-record control (3) to idle.

2. Remove the reels from the recorder, turning the full reel over and placing it on the right reel plate (2A) and the empty reel on the left reel plate (2B).

3. Properly thread the tape and proceed with the recording.

4. After this track has been recorded the first track of recording is ready to be played without rewinding, by reversing the reels as described in step 2 above.

Fast Forward And Fast Rewind-

High speed forward or reverse can be obtained by pressing the desired knob (4A or 4B) toward the

head cover. Movement of these controls will wind the tape on the desired reel at a high speed as long as the control is held in this position. These are used primarily in locating a desired portion of a recording in a few seconds.

CAUTION: Do not attempt "Fast Forward" or "Fast Rewind" with the play-record control (3) on anything but idle position, as damage to the unit or breaking of the tape may result.

Braking-

The Columbia is equipped with a quick stop when in high speed, either direction. Move both "Fast Forward" and "Fast Rewind" controls toward the head cover and then release both at the same time. For example: when in fast forward speed, continue to hold control and with the other hand move "Fast Rewind" control toward head cover. When machine stops, release both controls at the same time. If a coasting stop is desired, release control in motion and tape will glide to a momentum stop.

To Play A Recording-

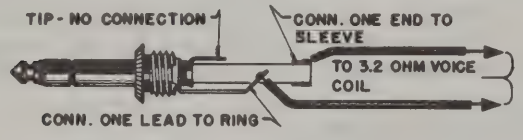
1. Thread tape as described under "Threading The Tape".

2. Turn play-record control (3) clockwise without depressing until it locks.

3. Adjust the "Volume" and "Tone" controls for desired listening level.

To Use An External Speaker-

1. You may want to use a larger one than the ones in the recorder. To do this you will need a three conductor phone plug connected as shown in sketch.



2. Plug this into the Output jack and play the recorder thru the external speaker. The internal speakers is cut off.

CAUTION: Do not connect three conductor plug into Output jack without external speaker attached; as damage to the output tube, transformer, and "Tone Control" may result.

To Edit And Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

2. For best results, cut tape at a slight diagonal, join ends together with splicing tape on the glossy side and trim off any excessive width.

Erasing Recorded Material-

In the record position any recording on the tape is automatically erased before a new recording is put on the tape. If it is desired to erase a recording without putting anything on the tape follow the normal recording procedure, but leave the "Volume" control set at its extreme counterclockwise position.

To Use As A Public Address System-

1. Insert the microphone plug into the "Radio-Phono" jack.

2. Leave the play-record control (3) in idle position.

3. Speak into the microphone and adjust the "Volume" and "Tone" controls for desired level.

4. Do not have the microphone too close to the speaker or a feedback howl will result.

ADJUSTMENTS

Removing Unit From Case-

All service work except cleaning of the head and pressure roller and adjustment of the head and pressure pad assembly require removal of the unit from the carrying case.

1. To remove unit from carrying case, disconnect power cord and remove the four phillips head screws from bottom of case and carefully lift unit straight up and out.

Spindle (9A and 9B) End Play Adjustments-

The spindles should have from 1/32" to 1/16" of up and down movement. Loosen the set screw in the pulley (36 or 47) and move the pulley up or down until the correct amount of end play is obtained.

Tape Up And Feed Reel Drag Adjustment-

When the play-record control (3) is released, the reels should stop right away to prevent looping of the tape. Also when in fast forward or rewind and the control is released the reels should coast to a stop without looping the tape. The stop arms on the motor-board (point "B" on exploded view) that the take-up and feed reel arms (31 and 52) rest against when the tape is not moving are what govern this. The stop arms should be bent to force the take-up reel arm (52) and the feed reel arm (31) over for enough to take up enough belt tension so that the spindles just start to revolve without the reels in place. The play-record control (3) should be in its extreme counterclockwise position when making this adjustment. With the reels in place the spindles should not revolve. If one or the other dose, force the stop arm (point "B" on exploded view) over until it stops revolving.

Lifter Arm (16) Adjustment-

This adjusts the distance that the contact strip on the play-record switch will move when going into the record position. If an adjustment is necessary,

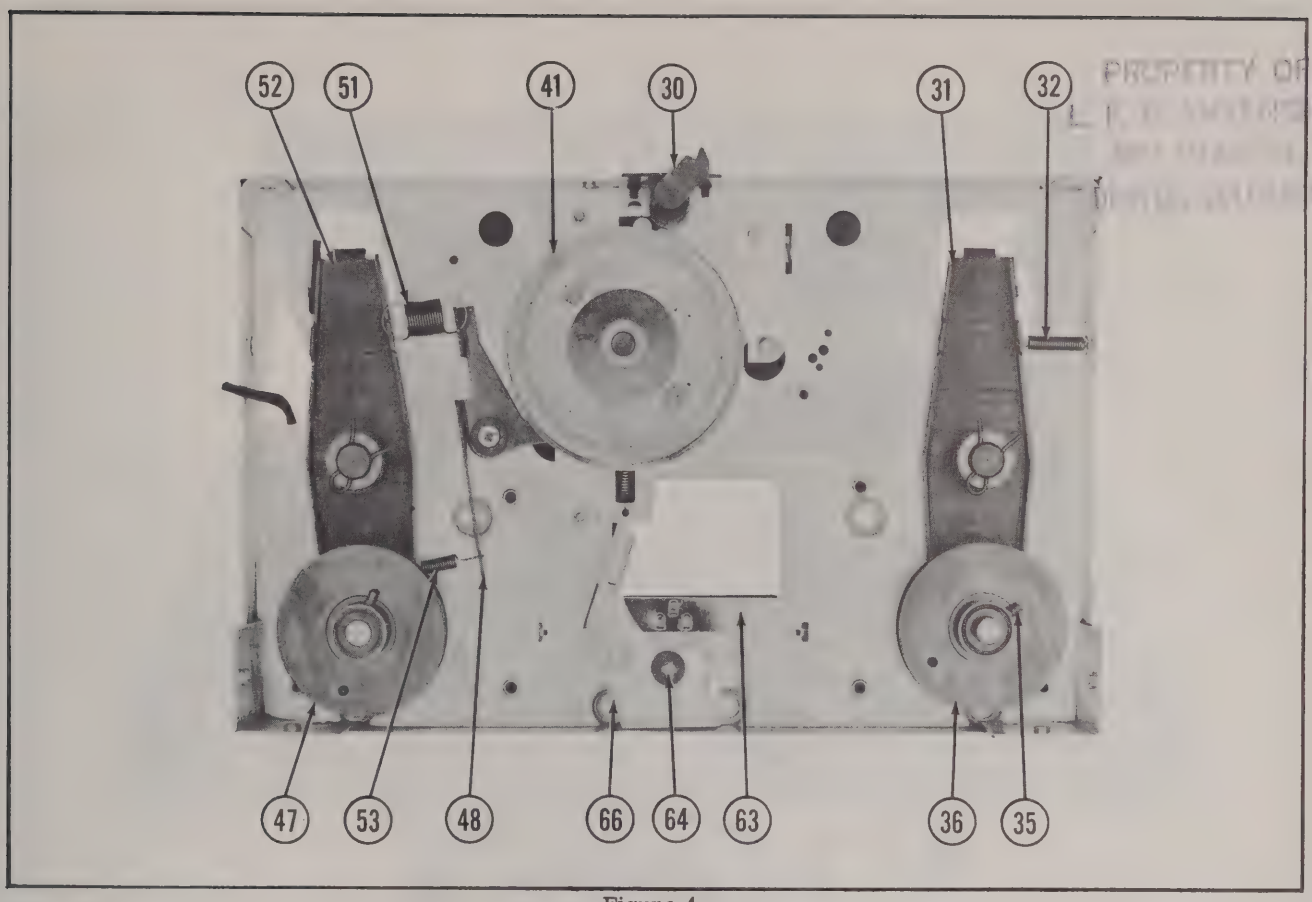


Figure 4

depress and turn the play-record control (3) clockwise. Loosen the set screw in the lifter arm (16) and rotate control knob (3) to the left or right to center the contact strip with the contacts on the left end of the switch. Make sure lifter arm (16) is down as far as it will go and tighten its set screw.

Play-Record-Erase Head Adjustment-

It is very important that the head (8) be lined up perfectly with the tape. If it is not, low output, loss of high frequencies, or track overlap may result. If head (8) requires replacement the complete assembly comprised of head (8) and head holder (7) should be replaced. The head holder (7) is adjusted individually to each head (8) and sealed at the factory. When installing head (8) observe the following precautions:

1. One is the head height. This is set by placing a .179" gauge (between 11/64" and 3/16") near the mounting bracket and between base plate (25) and bottom of head holder (7). Push down on head (8) and tighten screw (26). Withdraw gauge.

2. The second adjustment is for output and frequency response. To make this adjustment a tape on which a 3000 cycle note has been recorded by a unit known to be in good operating condition will be required. Connect an output meter or an A.C. voltmeter across the speaker voice coil of the unit to be adjusted. While playing back the 3000 cycle note tape, pivot head (8) back and forth on mounting screw (26) until maximum amplitude on output meter is achieved. Make sure that head (8) has not changed its height. If a 3000 cycle note tape cannot be made, use a recording with high note content and make the adjustment described above.

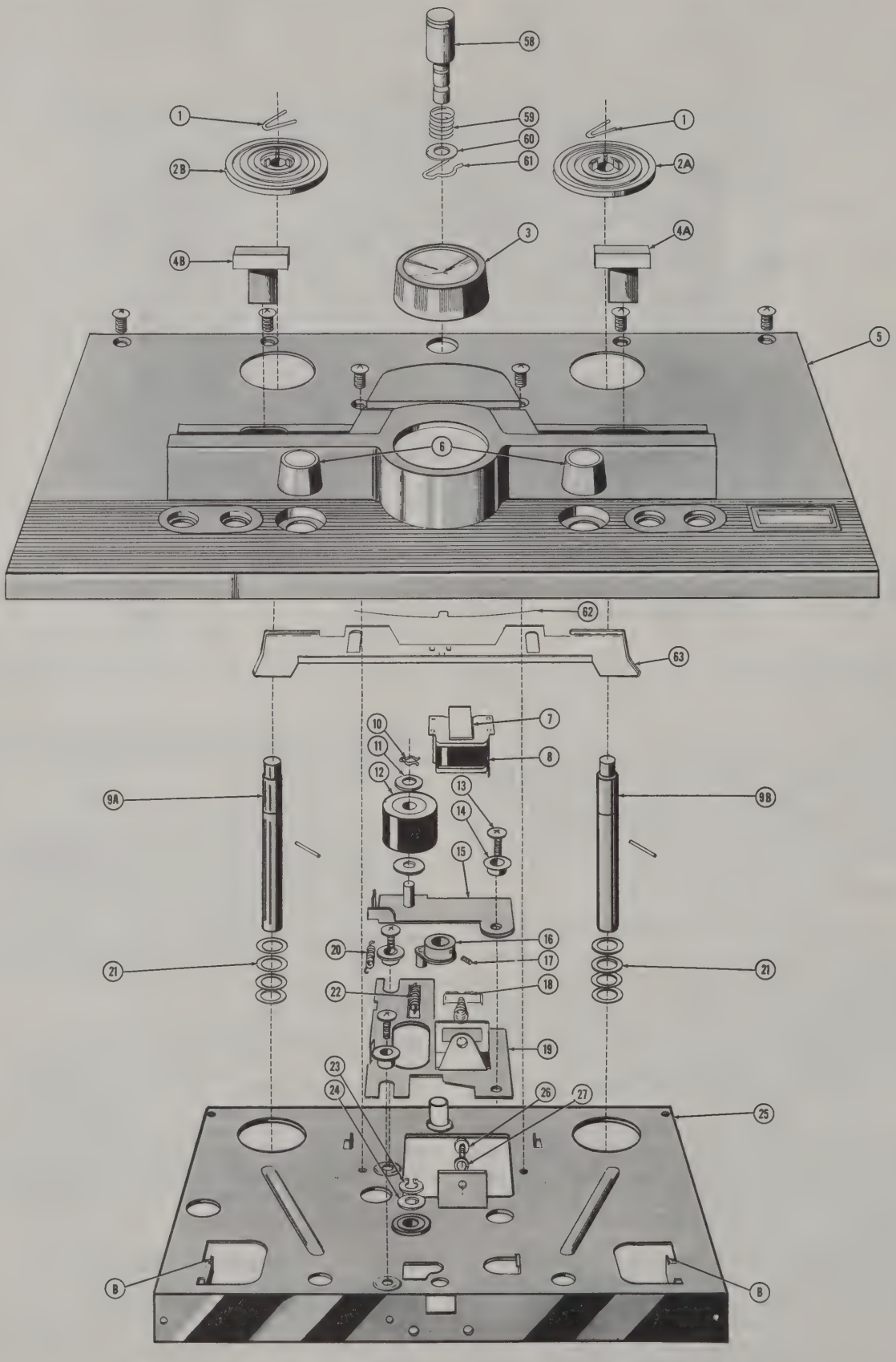
3. Track overlap, this should be checked by first making a recording on a blank tape with the unit being checked. Do not rewind the tape, but merely reverse the reels and playback the other track. There should be no sound but, if what is heard is backwards, there is track overlap. To correct this, it will be necessary to adjust the tape guide on side of head holder (7) by bending it upwards. This should move the tracks further apart.

NOTE: When ordering a replacement head, be sure to get the complete assembly of head, plug and bracket. The bracket is adjusted to the individual head and sealed at the factory. Also, when ordering a replacement motor, be sure to get the complete assembly of motor, pulley and plug. The pulley is turned down on the individual motor and is not interchangeable.

AMPLIFIER ADJUSTMENT

Hum Balance Adjustment-

If tube V1 or V2 is replaced or the head changed the setting of the hum balance pot (R3) should be checked. To do this, connect an external speaker to the unit as described under "To Use An External Speaker". Connect an A.C. voltmeter with a .1 volt A.C. scale across the speaker voice coil. Turn the



A PHOTOFACT "EXPLODED" VIEW
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Figure 5A. Exploded View Of Parts Above Baseplate.

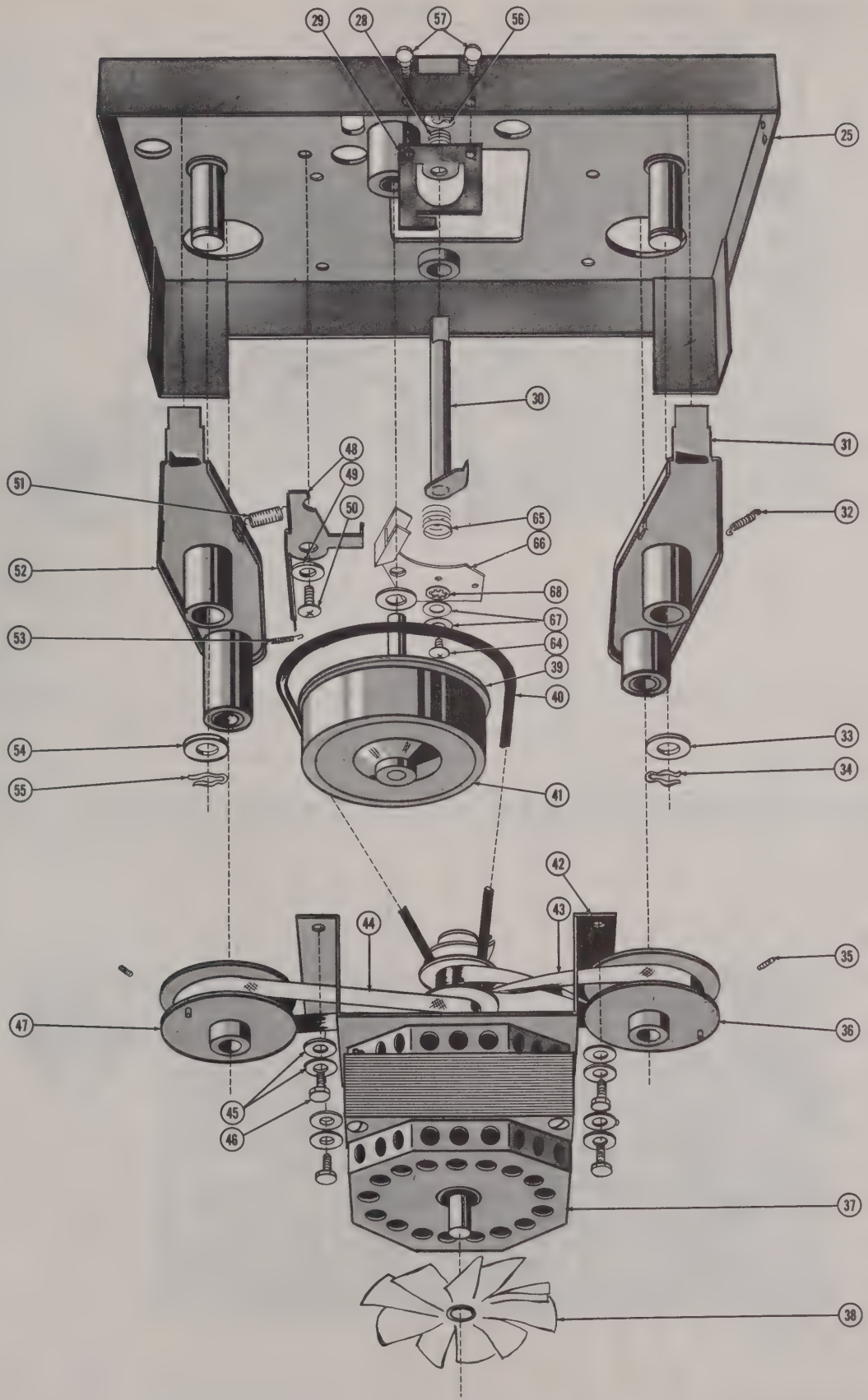

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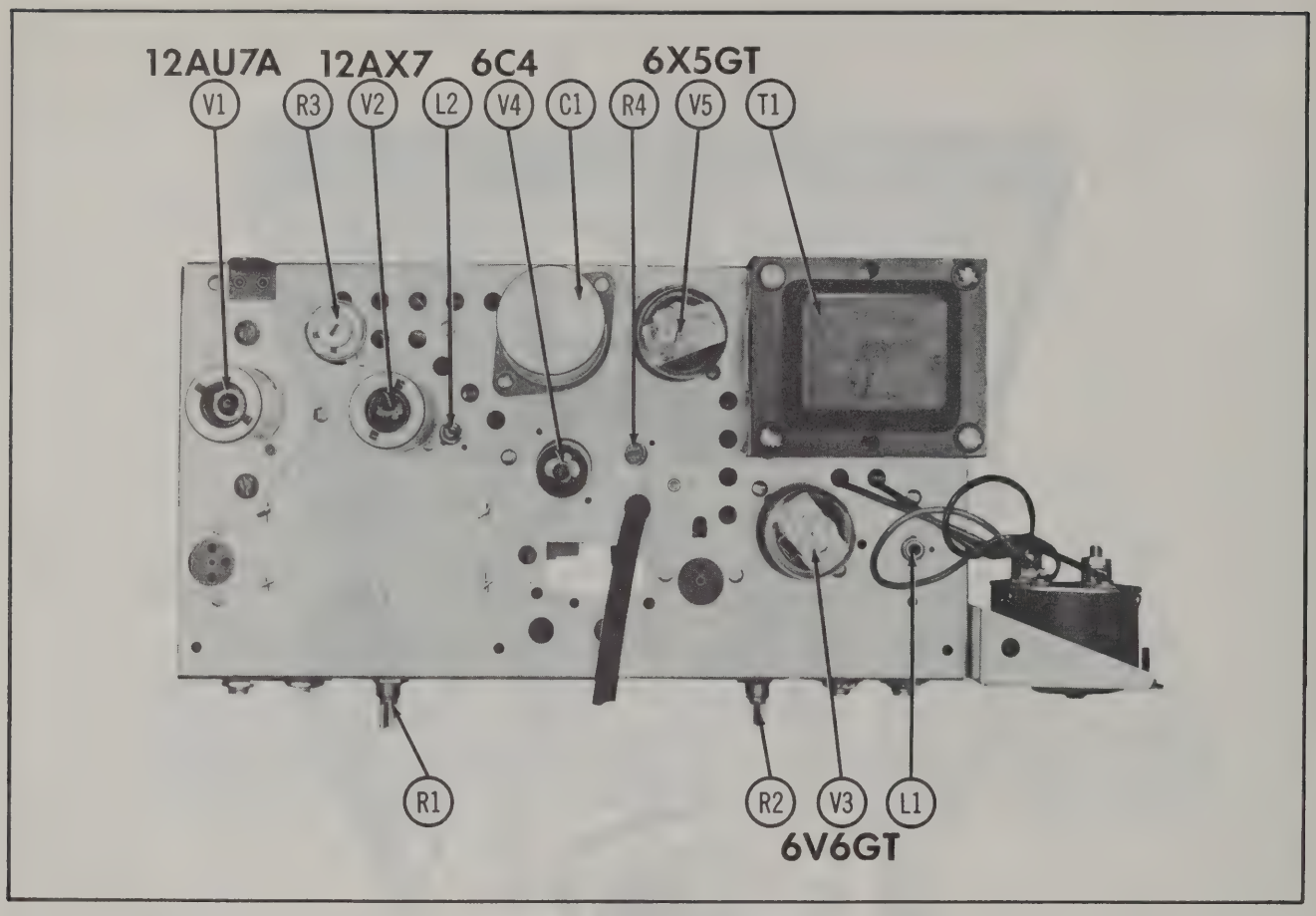
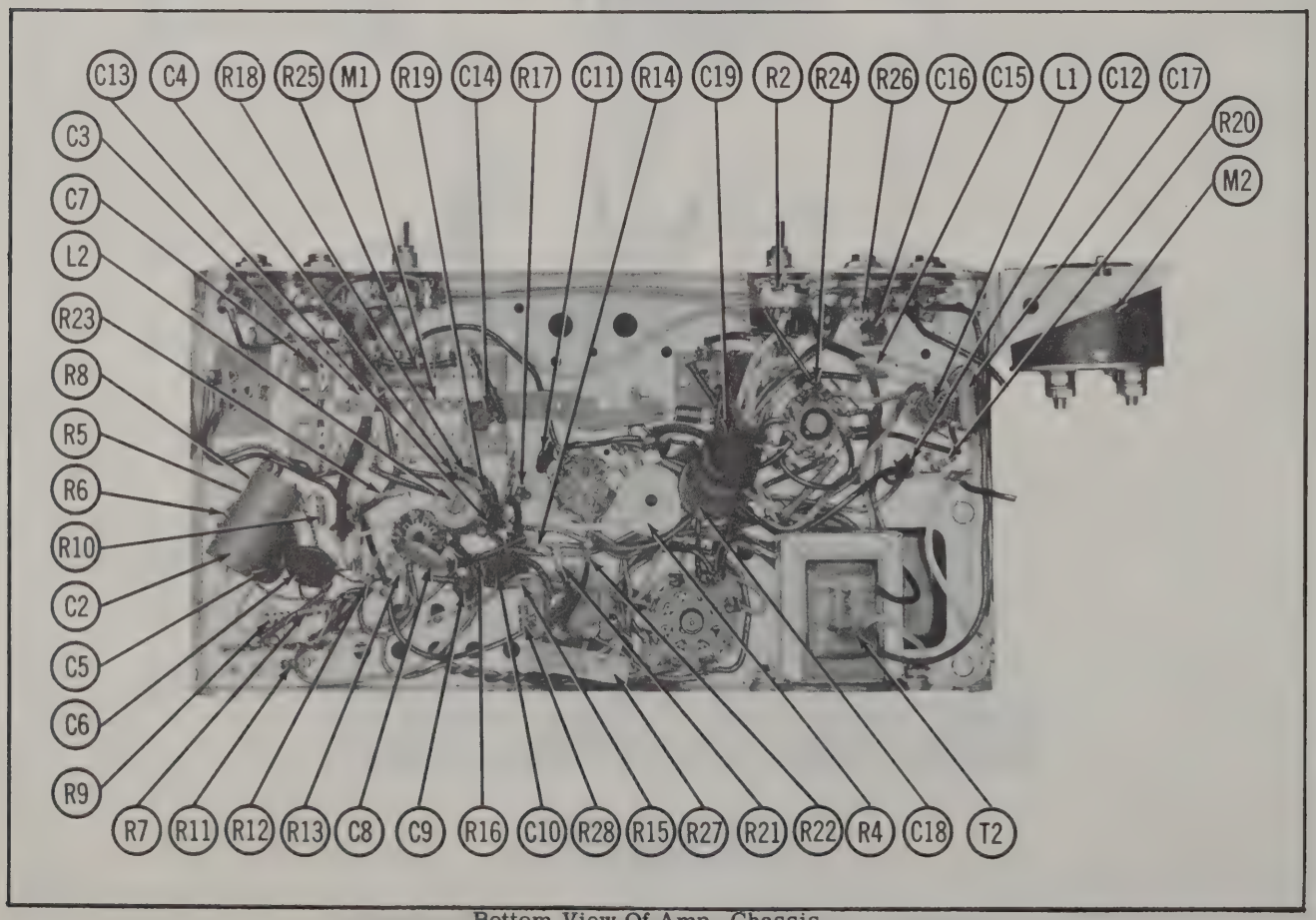
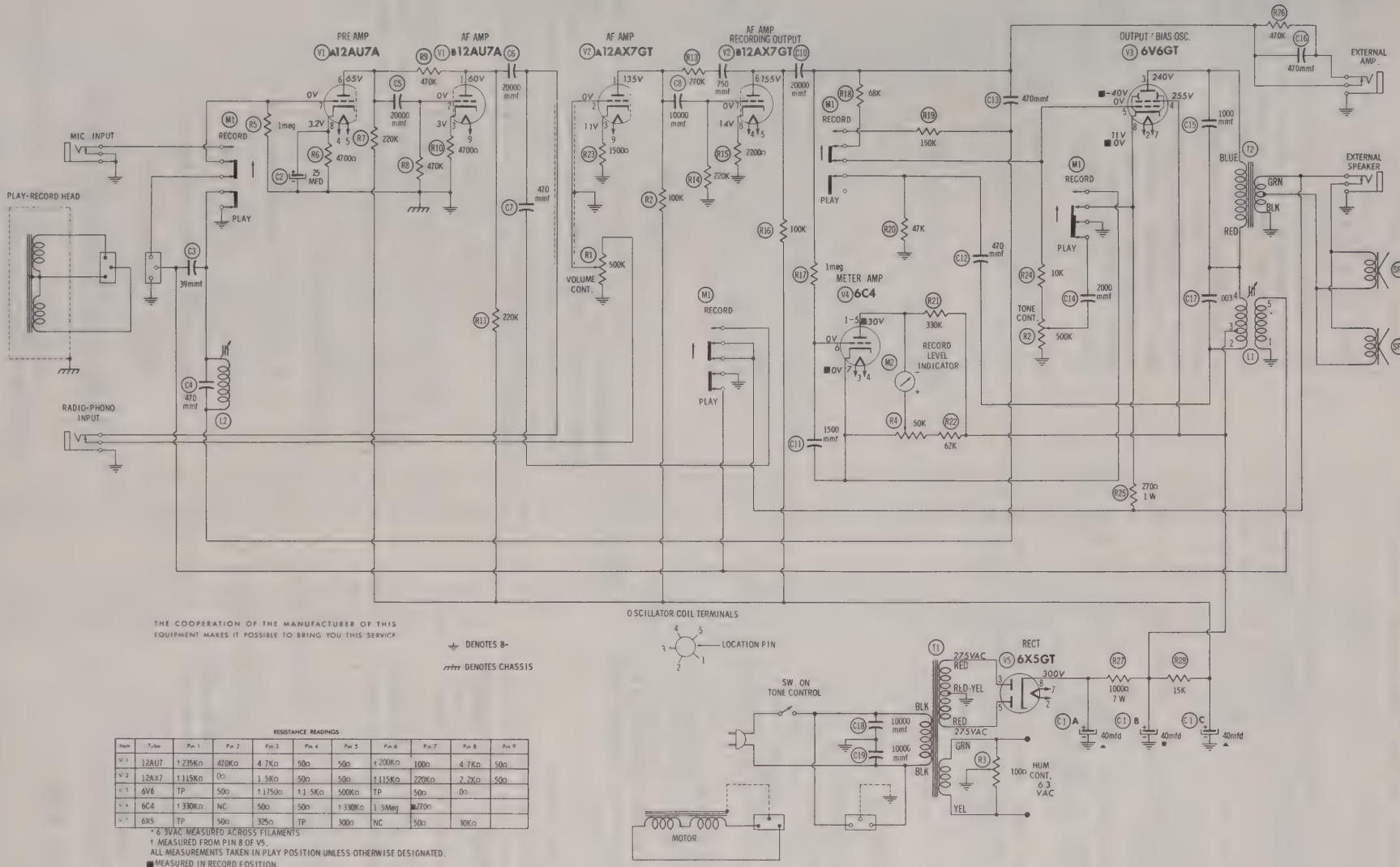
Figure 5B. Exploded View Of Parts Below Baseplate.



Top View Of Amp. Chassis.



Bottom View Of Amp. Chassis.



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V-1	12AU7	†235KΩ	470KΩ	4.7KΩ	50Ω	50Ω	†200KΩ	100Ω	4.7KΩ	50Ω
V-2	12AX7	†115KΩ	0Ω	1.5KΩ	50Ω	50Ω	†115KΩ	220KΩ	2.2KΩ	50Ω
V-3	6V6	TP	50Ω	†1750Ω	†1.5KΩ	500KΩ	TP	50Ω	0Ω	
V-4	6C4	†330KΩ	NC	50Ω	50Ω	†330KΩ	1.5Meg	■270Ω		
V-5	6X5	TP	50Ω	325Ω	TP	300Ω	NC	50Ω	30KΩ	

* 6.3VAC MEASURED ACROSS FILAMENTS
† MEASURED FROM PIN 8 OF V5.
ALL MEASUREMENTS TAKEN IN PLAY POSITION UNLESS OTHERWISE DESIGNATED.
■ MEASURED IN RECORD POSITION

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COLUMBIA
MODEL 462

"Volume" and "Tone" controls clockwise. Place the play-record control (3) in "Play" position. Put the A.C. meter on the .1 volt scale and adjust the hum pot. (R3), which is located between tubes V1 and V2 on top of the chassis, to its minimum reading. It should not exceed .1 volt.

The following adjustments should be made whenever circuit components are replaced or repaired in the amplifier. The adjustments should be checked periodically. These adjustments must be made with the set turned on and in record position, but with no signal input.

1. Adjust oscillator coil (L1) for 50KC reading on frequency meter.

2. Meter adjustment (R4), should be set to a point where needle on the meter rests directly over the black dot at the left side of the meter.

3. To set 50KC trap, volume must be set at maximum. Adjust (L2) for minimum 50KC reading at external amplifier jack.

TROUBLES

Won't Take Up Tape Properly-

1. Spindle (9A) binding.
   (a) Lubricate.

2. Belt (44) slipping.
   (a) Clean motor pulley and pulley (47).

3. Belt (44) broken.
   (a) Remove bracket (42) and replace belt.

4. Set screw loose in pulley (47).
   (a) Tighten and leave 1/32" to 1/16" end play in spindle.

5. Pulley (47) broken.
   (a) Replace pulley.

Fast Forward Won't Function Properly-

1. See above except for step 2.

Fast Rewind Won't Function Properly-

1. Spindle (9A or 9B) binding.

2. Belt (43) slipping.
   (a) Clean motor pulley and pulley (36).

3. Belt (43) broken.
   (a) Remove bracket (42) and replace belt.

4. Set screw loose in pulley (36).
   (a) Tighten and leave 1/32" to 1/16" end play in spindle.

5. Pulley (36) broken.
   (a) Replace pulley.

Speed Variation Or Wow-

1. Slippage
   (a) Clean motor pulley, flywheel and capstan (41) and pressure roller (12) with a petroleum solvent, not carbon-tetracholoride. Replace rubber rollers if they appear oil soaked.

2. To much feed reel drag.
   (a) Check adjustment as described under "Take-Up And Feed Reel Drag Adjustment".

3. Flat spot on rubber roller (12).
   (a) A rapid thumping sound while the unit is running may indicate a flat spot on the rubber tire. If this condition does not clear up after several minutes of running time replace the roller.
   (b) If the surface of the rubber roller is not smooth and even, replace the part.
   (c) Should the bearings on the rollers show signs of excessive wear or be extremely wobbly, the rollers should be replaced.

4. Tight feed of take-up spindle (9A or 9B).
   (a) Check adjustment as described under "Spindle End Play Adjustment".
   (b) Lubricate.

5. Tight pressure roller (12).
   (a) Lubricate.

6. Tight flywheel shaft (41).
   (a) Lubricate.

Tape Creeps Out Of Slot-

1. Head (8) improperly adjusted.
   (a) "See" Play-Record-Erase Head Adjustment."

CLEANING

The record playback head (8), capstan shaft and pressure roller (12) are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. This can cause distortion, weak output and poor erasure. Use a soft cloth and alcohol to clean the bead surfaces; capstan and pressure roller.

LUBRICATION

The lubricants applied at time of manufacture should be sufficient for a long period of time. Approximately once a year, or in the event that parts are replaced, lubricate the unit as follows:

With No. 20 Motor Oil-

1. Take-up reel arm (52) bushing.

2. Feed reel arm (31) bushing.

3. Spindle (9A and 9B) bearings.

4. Flywheel (41) bearings.

With Staput No. 312 Grease Or Lubriplate-

1. Pressure plate (19) at the slide button and the guide on the right side.

2. On the stud of the lifter arm (16).

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	460162	Reel Holder Retainer	34	460110	Retainer
2A	012372	Feed Reel Holder	35	600247	Set Screw
2B	012372	Take Up Reel Holder	36	011317	Feed Reel Pulley
3	310300	Play-Record Knob	37	011692	Motor, 115V, 60 Cycle, Inc.
4A	310299	Fast Rewind Knob			Pulley, Cable & Plug
4B	310299	Fast Forward Knob	38	011321	Fan
5	012502	Top Plate	39	580141	Washer
6	310301	Volume & Tone Knobs	40	490087	Rubber Belt
7		Head Holder (Part Of Head)	41	011694	Flywheel & Shaft Assembly
8	011311	Head (Inc. 7)	42	011739	Motor Mounting Bracket
9A	011319	Take Up Reel Spindle	43	490089	Feed Reel Drive Belt
9B	011319	Feed Reel Spindle	44	490089	Take Up Reel Drive Belt
10	460111	Pressure Roller Retainer	45	580056	Washer
11	580143	Cloth Washer	46	600256	Screw
12	011236	Pressure Roller	47	011317	Take Up Reel Pulley
13	600243	Screw #6 - 32 x 1/4" (3)	48	100809	Take Up Lever
14	200288	Slide Button (3)	49	200288	Washer
15	012328	Pressure Roller Arm	50	600243	Screw
16	012329	Lifter Arm	51	420161	Take Up Spring
17	600247	Set Screw	52	011329	Take Up Arm
18	011316	Pressure Shoe, Inc. Felt Pads	53	420172	Take Up Lever Brake Spring
19	012381	Pressure Plate	54	580156	Washer
20	420174	Capstan Pressure Spring	55	460110	Retainer
21	580141	Washer	56	460117	Retainer
22	420171	Pressure Plate Spring	57	600111	Screws
23	460018	Shaft & Flywheel Retainer	58	011693	Speed Control Knob
24	580141	Washer	59	420151	Spring Control Knob
25	012383	Base Plate	60	580056	Control Knob Washer
26	600137	Retains Head Screw	61	420152	Detent Spring
27	580056	Washer	62	420177	Brake Plate Spring
28	420109	Record Release Spring	63	100880	Brake Plate
29	100660	Control Shaft Bracket	64	600242	Screw
30	011723	Control Shaft	65	420151	Compression Spring
31	011330	Rewind Arm	66	100760	Speed Control Bracket
32	420173	Rewind Arm Brake Spring	67	580056	Flatwasher
33	580156	Washer	68	580019	Lockwasher

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1		12AU7A Pre Amplifier	R1	740051	Volume Cont., 500K
V2		12AX7 AF Amplifier	R2	740052	Tone Control & Switch, 500K
V3		6V6GT Audio Output, Bias Osc.	R3	740045	Hum Control, 200Ω
V4		6C4GT	R4	740099	Meter Adj. Cont., 50K
V5		6X5GT Rectifier	R5	760001	Resistor, 1Meg., 1/2 W.
C1A	770088	Elect. Cap., 40MFD. @ 300V.	R6	760017	Resistor, 4700, 1/2 W.
C1B		Elect. Cap., 40MFD. @ 300V.	R7	760036	Resistor, 220K, 1/2 W.
C1C		Elect. Cap., 40MFD. @ 300V.	R8	760037	Resistor, 470K, 1/2 W.
C2	770003	Elect. Cap., 25MFD. @ 25V.	R9	760037	Resistor, 470K, 1/2 W.
C3	770111	Cap. Ceramic, 39MMF.	R10	760017	Resistor, 4700Ω, 1/2 W.
C4	770090	Cap. Ceramic, 470MMF.	R11	760036	Resistor, 220K, 1/2 W.
C5	770095	Cap. Ceramic, 20000MMF.	R12	760010	Resistor, 100K, 1/2 W.
C6	770095	Cap. Ceramic, 20000MMF.	R13	760052	Resistor, 270K, 1/2 W.
C7	770090	Cap. Ceramic, 470MMF.	R14	760036	Resistor, 220K, 1/2 W.
C8	770096	Cap. Ceramic, 10000MMF.	R15	760047	Resistor, 2200, 1/2 W.
C9	770094	Cap. Ceramic, 750MMF.	R16	760010	Resistor, 100K, 1/2 W.
C10	770095	Cap. Ceramic, 20000MMF.	R17	760001	Resistor, 1Meg., 1/2 W.
C11	770098	Cap. Ceramic, 1500MMF.	R18	760062	Resistor, 68K, 1/2 W.
C12	770090	Cap. Ceramic, 470MMF.	R19	760064	Resistor, 150K, 1/2 W.
C13	770090	Cap. Ceramic, 470MMF.	R20	760013	Resistor, 47K, 1/2 W.
C14	770110	Cap. Ceramic, 2000MMF.	R21	760076	Resistor, 330K, 1/2 W.
C15	770140	Cap. Ceramic, 1000MMF.	R22	760079	Resistor, 62K, 1/2 W.
C16	770090	Cap. Ceramic, 470MMF.	R23	760003	Resistor, 1500, 1/2 W.
C17		Cap. Mica, .003MFD.	R24	760019	Resistor, 10K, 1/2 W.
C18	770071	Cap. Ceramic, 10000MMF.	R25	760115	Resistor, 270Ω, 1 W.
C19	770071	Cap. Ceramic, 10000MMF.	R26	760037	Resistor, 470K, 1/2 W.

ELECTRICAL PARTS LIST (Con't.)

Ref. No.	Part No.	Description	Ref No.	Part No.	Description
R27	760304	Resistor, 1K, 7 W.	L2	700066	Coil, Variable Choke
R28	760027	Resistor, 15K, 1/2 W.	M1	740053	Play-Record Switch
T1	700069	Power Transformer	M2	700085	Record Level Indicator
T2	700071	Output Transformer	SP1	012352	PM Speaker, 5" x 7"
L1	700080	Osc. Coil (Inc. C17)	SP2	012352	PM Speaker, 5" x 7"

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COLUMBIA RECORDS
MODELS HF-1, 417

COLUMBIA RECORDS
MODELS HF-1, 417

TRADE NAME	Columbia Records Models HF-1, 417
MANUFACTURER	Columbia Records, 799 Seventh Ave., New York, 19, N.Y.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Manual Record Player (Model HF-1)
TUBES (Three)	Types 12AX7 AF Amp.-Phase Inverter, (2) 50C5 Output
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .31 Amp. @ 117 Volts AC

MODEL 417 HAS A 3 SPEED AUTOMATIC RECORD CHANGER. FOR SERVICE INFORMATION ON THIS UNIT — SEE SIMILAR V-M MODEL 954B — PHOTOFACT SET #302 - FOLDER 12.

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1956 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under international Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

COLUMBIA RECORDS
Models HF-1, 417

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier-Phase Inverter	12AX7	
V2	Output	50C5	
V3	Output	50C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Columbia Records PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150		PRS150V40-30-20	BBRT43215	TCT3116	TDL-403020-150	FMT-312	TVA-3448
B	30	150							
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Columbia Records PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	680			SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	Note 1
C4	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C5	.25	200		P288N-25		CUB2P25		PT4025	2TM-P25	Note 2
C6	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C7	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C8	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C9	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C10	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	Note 3
C11	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	

Note 1. Model 417 uses .01MFD in this application.
Note 2. Some versions use .25MFD in this application.
Note 3. Not used in Model 417.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Columbia Records PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	100KΩ	½		AB-40	A47-100K-S	Q11-128	U-41	Bass
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
R2A	500KΩ	½		AB-59	A47-500K-S	Q11-133	U-50	Treble
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A
R3A	1Meg	½		AB-70	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R3A
C	Switch			KB-1	SWE-12	76-1	US-26	Attach to R3A

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Columbia Records PART No.	IRC PART No.	
R4	33KΩ			BTS-33K	
R5	220KΩ 5%			BTS-220K 5%	
R6	39KΩ			BTS-39K	Note 1
R7	330Ω			BTS-330	Note 2
R8	3000Ω			BTS-3000	Note 3
R9	6.8Meg			BTS-6.8Meg	
R10	270KΩ			BTS-270K	Note 4
R11	270KΩ 5%			BTS-270K 5%	
R12	270KΩ 5%			BTS-270K 5%	
R13	270KΩ			BTS-270K	
R14	100Ω	1		BTA-100	Note 5
R15	5600Ω			BTS-5600	Note 6
R16	1600Ω			BTS-1600 5%	Note 7
R17	47Ω	2		BTS-47	
R18	22Ω	1			
R19	1Meg			BTS-1Meg	Note 8

Note 1. Some versions use 47KΩ in this application.
Note 2. Some versions use 270Ω in this application.
Note 3. Some versions use 4700Ω in this application.
Note 4. Some versions use 220KΩ in this application.
Note 5. Model 417 uses 75Ω, 2 watt in this application.
Note 6. Some versions use 3300Ω in this application.
Note 7. Some versions use 220Ω, 2 watt in this application.
Note 8. Not used in some versions.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Columbia Records PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3.2KΩ CT	1.551 SEC. 2 1.1Ω RES.							

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Columbia Records PART No.	QUAM PART No.	RCA TYPE No.	
SP1	6"	PM	3.1Ω		6A21	229S1	
SP2	6"	PM	3.1Ω		6A21	229S1	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Columbia Records PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.085ADC		1005A	RS100	6S150	5P1	150	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	Columbia Records PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2		112-TS	A-1 & A-3	46-T	0-1 or S-1 & 0-3	

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

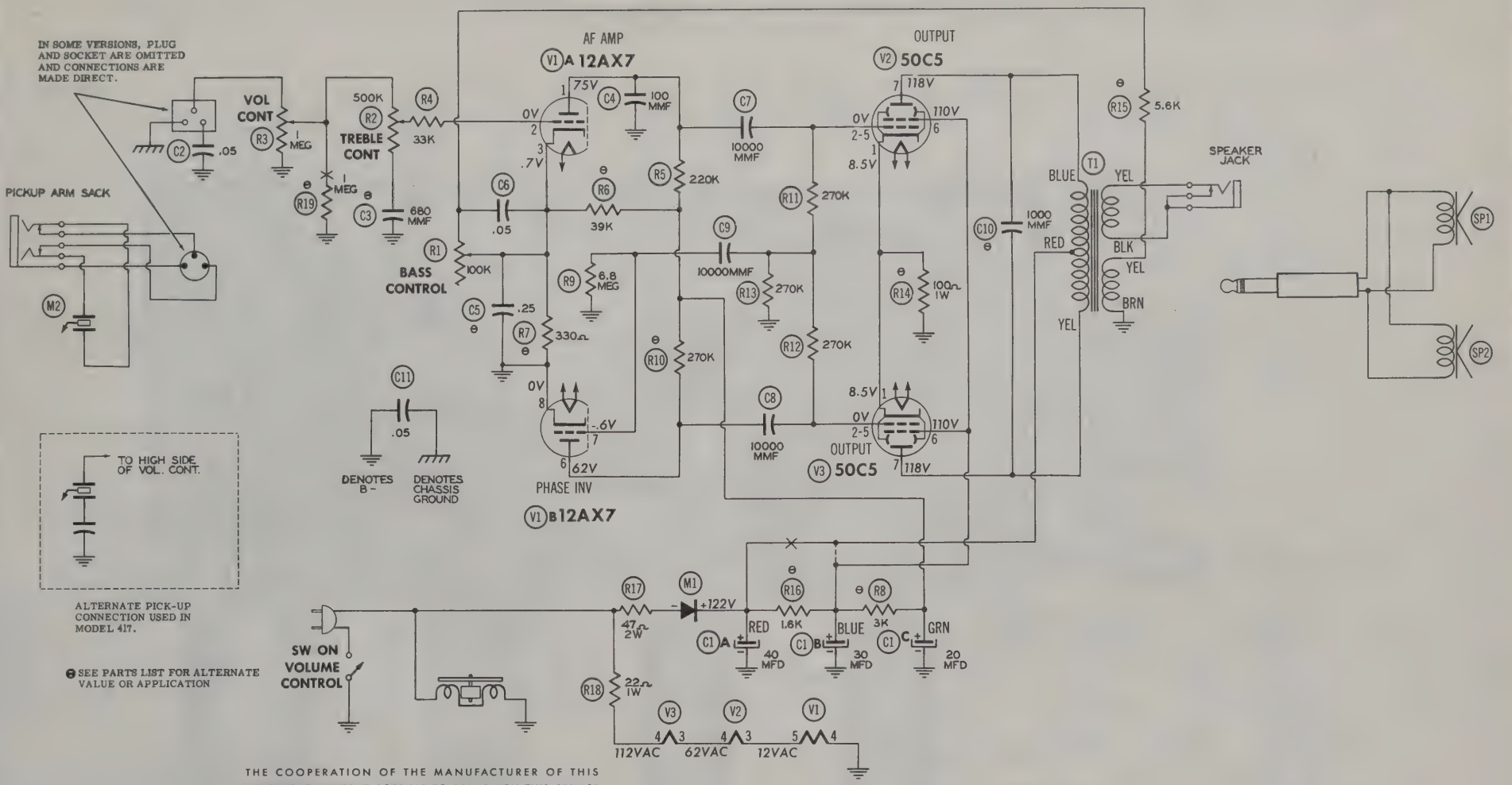
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	Columbia Records PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M3		†CR-55 or ♦CR-55D and †CR-55LP or ♦CR-55LPD	†C-449 or ♦C-449D and †A-448 or ♦A-448D	†W-64S and †W-64MGS	† Jewel ♦ Diamond

CHASSIS-BOTTOM VIEW

COLUMBIA RECORDS
Models HF-1, 417



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	† 224KΩ	400KΩ	330Ω	0Ω	12Ω	† 274KΩ	6.8Meg	0Ω	6Ω
V 2	50C5	100Ω	540KΩ	12Ω	62Ω	540KΩ	† 1.6KΩ	† 120Ω		
V 3	50C5	100Ω	540KΩ	62Ω	112Ω	540KΩ	† 1.6KΩ	† 120Ω		

† MEASURED FROM OUTPUT OF MI.
ALL MEASUREMENTS TAKEN WITH PHONO MOTOR DISCONNECTED.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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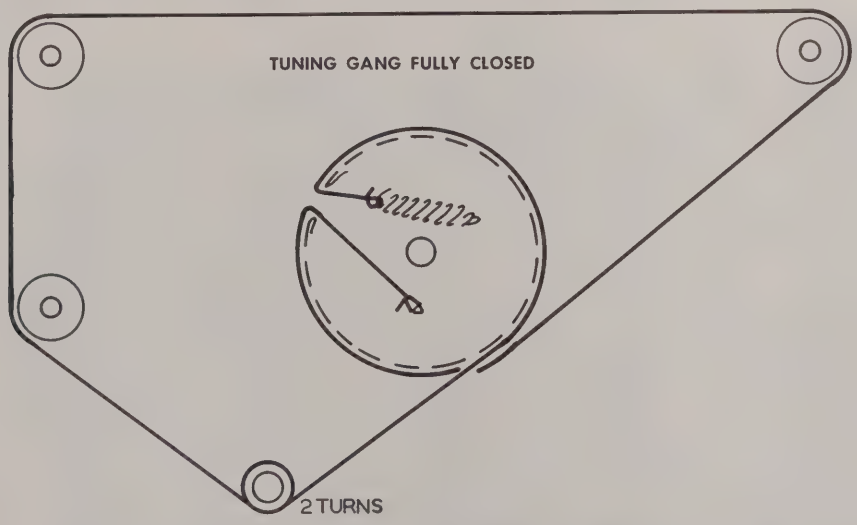
3924 MEADE ST.
DENVER, COLORADO

DAVID BOGEN
MODELS RR29, W

DAVID BOGEN
MODELS RR29, W

TRADE NAME	David Bogen Model RR29, -W			
MANUFACTURER	David Bogen Co., Inc., 29 Ninth Ave., New York 14, N.Y.			
TYPE SET	AC-DC Operated Multi-Band AM Superheterodyne Receiver			
TUBES	Eleven			
POWER SUPPLY	110-150-220 Volts AC-60 Cycles (or) 110 Volts DC			
RATING	.52 Amp. @ 117 Volts AC			
TUNING RANGE	Band #1	4.7 - 7.2MC	Band #4	14.5 - 16.8MC
	Band #2	7.1 - 10.5MC	Band #5	16.8 - 18.1MC
	Band #3	10.5 - 14.5MC	Band #6	530 - 1700KC



DIAL CORD STRINGING

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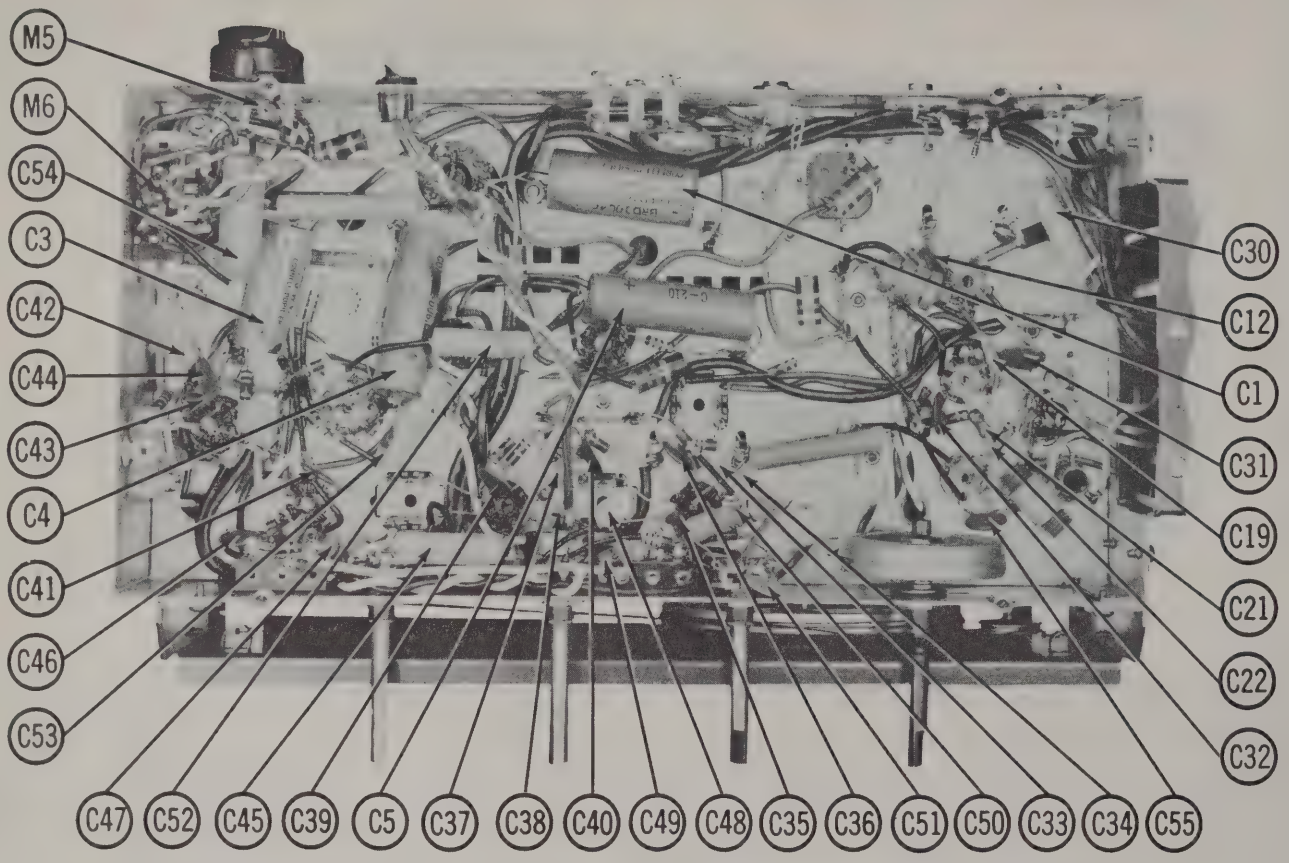
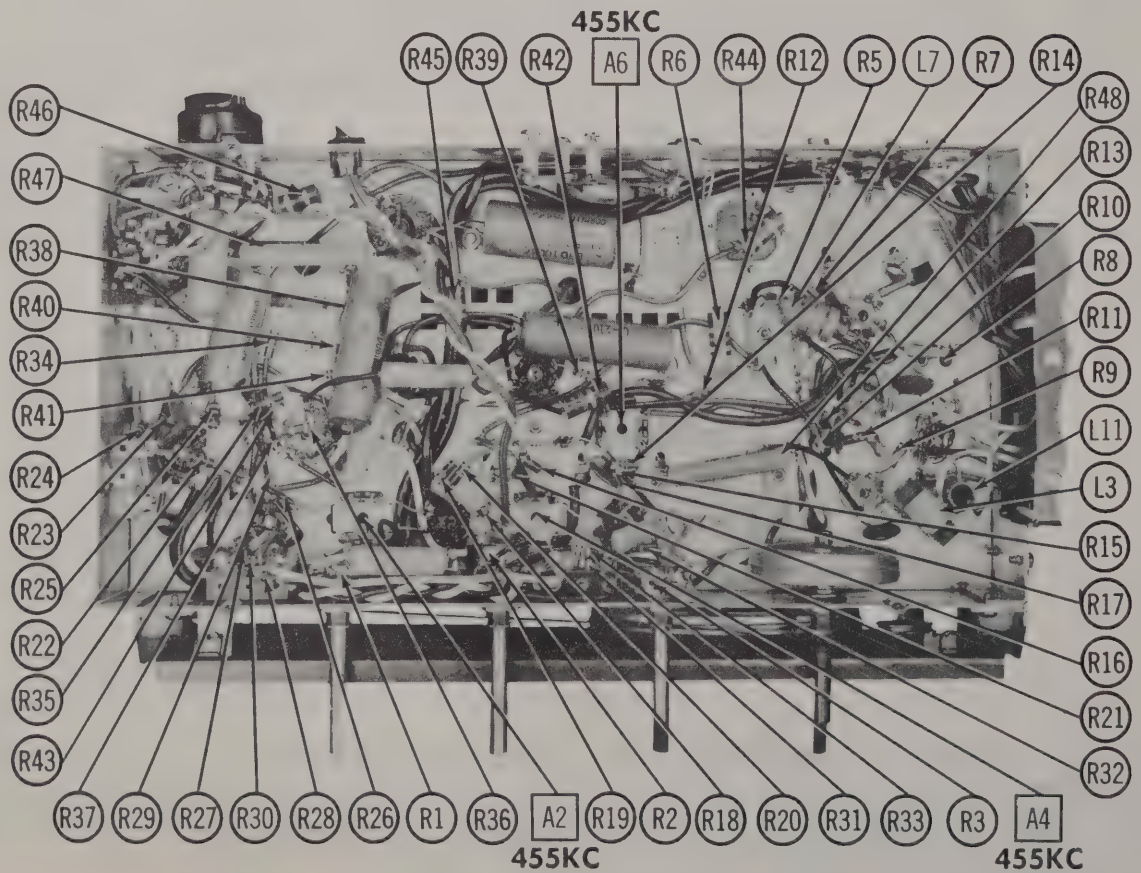
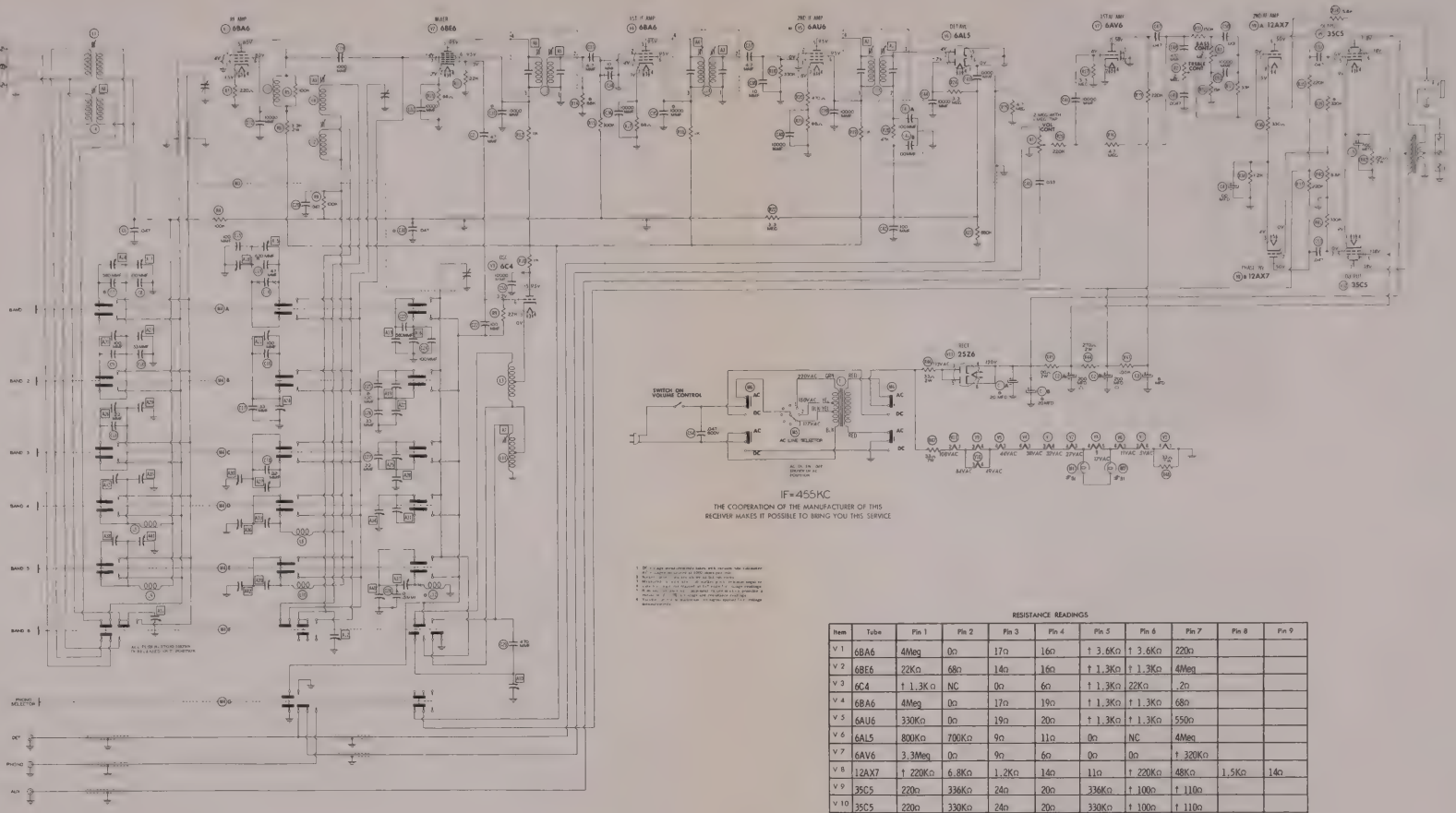


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BA6	4Meg	0Ω	17Ω	16Ω	↑ 3.6KΩ	↑ 3.6KΩ	220Ω		
V 2	6BE6	22KΩ	68Ω	14Ω	16Ω	↑ 1.3KΩ	↑ 1.3KΩ	4Meg		
V 3	6C4	↑ 1.3K Ω	NC	0Ω	6Ω	↑ 1.3KΩ	22KΩ	.2Ω		
V 4	6BA6	4Meg	0Ω	17Ω	19Ω	↑ 1.3KΩ	↑ 1.3KΩ	68Ω		
V 5	6AU6	330KΩ	0Ω	19Ω	20Ω	↑ 1.3KΩ	↑ 1.3KΩ	550Ω		
V 6	6AL5	800KΩ	700KΩ	9Ω	11Ω	0Ω	NC	4Meg		
V 7	6AV6	3.3Meg	0Ω	9Ω	6Ω	0Ω	0Ω	↑ 320KΩ		
V 8	12AX7	↑ 220KΩ	6.8KΩ	1.2KΩ	14Ω	11Ω	↑ 220KΩ	48KΩ	1.5KΩ	14Ω
V 9	35C5	220Ω	336KΩ	24Ω	20Ω	336KΩ	↑ 100Ω	↑ 110Ω		
V 10	35C5	220Ω	330KΩ	24Ω	20Ω	330KΩ	↑ 100Ω	↑ 110Ω		
V 11	25Z6	NC	23Ω	40Ω	20KΩ	40Ω	NC	24Ω	20KΩ	

ALL MEASUREMENTS TAKEN IN BROADCAST POSITION.
AC-DC SWITCH IN AC POSITION.
POWER SELECTOR SWITCH SET AT NO. 3 POSITION (117VAC).
↑ MEASURED FROM PIN 8 OF V11.
NC-NO CONNECTION.

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322-5

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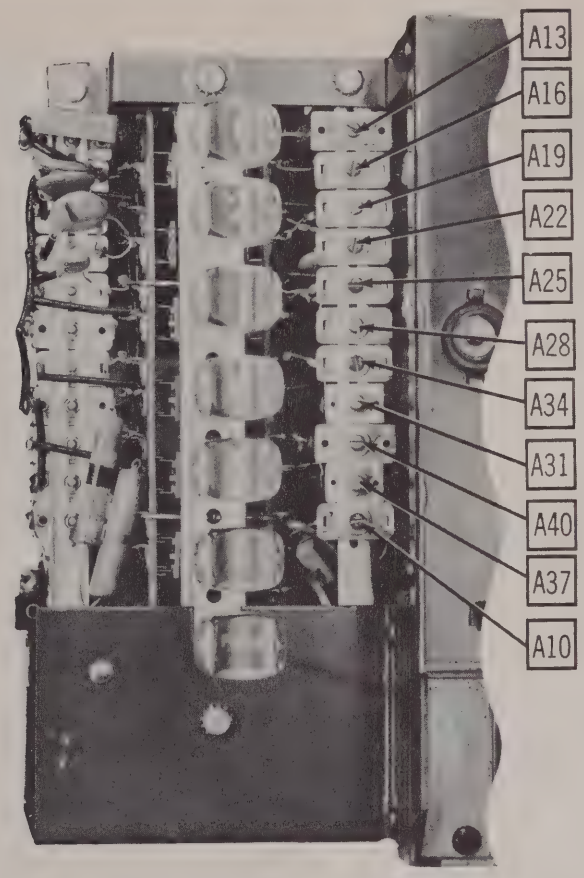
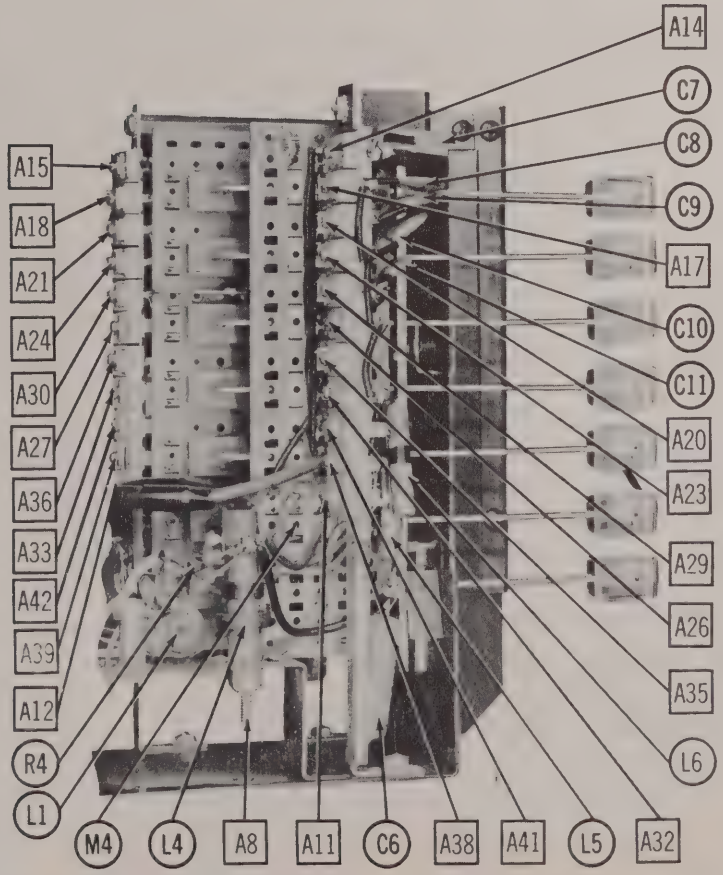


TUNING UNIT - FRONT VIEW



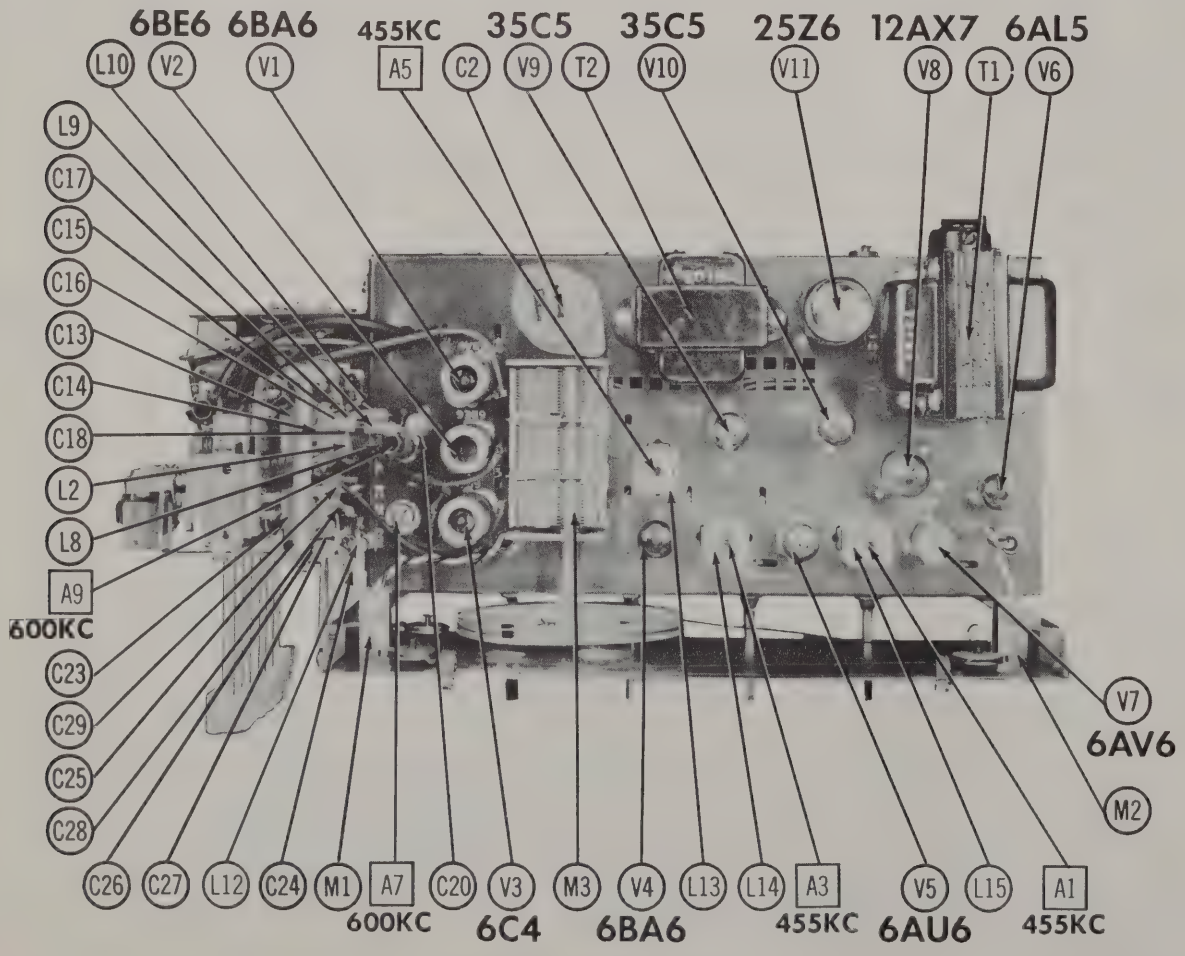
TUNING UNIT - SIDE VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400~Mod)	#6	1500KC	DC probe to point ◇A. Common to chassis.	A1, A2, A3, A4, A5, A6	Adjust for maximum deflection in order given.
2.	70Ω Carbon Resistor	High side thru 70Ω resistor to antenna terminal. Low side to chassis.	600KC	"	600KC	"	A7, A8, A9	"
3.	"	"	1500KC	"	1500KC	"	A10, A11, A12	"
4.	"	"	4.7MC	#1	4.7MC	"	A13, A14, A15	"
5.	"	"	7.2MC	"	7.2MC	"	A16, A17, A18	"
6.	"	"	7.1MC	#2	7.1MC	"	A19, A20, A21	"
7.	"	"	10.5MC	"	10.5MC	"	A22, A23, A24	"
8.	"	"	10.5MC	#3	10.5MC	"	A25, A26, A27	"
9.	"	"	14.5MC	"	14.5MC	"	A28, A29, A30	"
10.	"	"	14.5MC	#4	14.5MC	"	A31, A32, A33	"
11.	"	"	16.8MC	"	16.8MC	"	A34, A35, A36	"
12.	"	"	16.8MC	#5	16.8MC	"	A37, A38, A39	"
13.	"	"	18.1MC	"	18.1MC	"	A40, A41, A42	"



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BA6	
V2	Mixer	6BE6	
V3	Oscillator	6C4	
V4	1st IF Amplifier	6BA6	
V5	2nd IF Amplifier	6AU6	Note 1
V6	Detector-AVC	6AL5	
V7	AF Amplifier	6AV6	
V8	AF Amp. -Phase Inv.	12AX7	
V9	Output	35C5	
V10	Output	35C5	
V11	Rectifier	25Z6	

Note 1. 6BA6 may be used as an alternate.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA David Bogen PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	20	150	Note 1	PRS150V2020	BBRD2215	TCD45	TDL-D20-150	MTD-1520	TVA-2428
B	20	150	Note 1						
C2A	▲200	150		AFH2-23	XB009	FP216. 4	TMD21	D-095	TVL-2447
B	▲200	150							
C3	8	250		PRS250V8	BR825	TC51	TD-8-250	FM-2508	TVA-1503
C4	100	25		PRS25V100	BRH251	TC2501	TD-100-25	MTH-2510	TVA-1207
C5	100	25		PRS25V100	BRH251	TC2501	TD-100-25	MTH-2510	TVA-1207

Note 1. In some versions C1A is 40MFD and C1B is not used.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	. 047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C7	560	500		1469-00056		5R5T56		MS-356		Note 2
C8	100						N330-337-101			
C9	100						N330-337-101			
C10	33						N330K-330			
C11	22						N330K-220			
C12	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C13	620	500		1464-00062		1R5T62		MS-362		
C14	47			BPD-000047	DD-470	G033	831-470	UC-5447	5GA-Q47	Note 3
C15	100						N330-337-101			
C16	100						N330-337-101			
C17	33						N330K-330			
C18	22						N330K-220			
C19	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C20	. 047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C21	47			SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C22	100						N330-337-101			
C23	560	500		1469-00056		5R5T56		MS-356		
C24	100						N330-337-101			
C25	100						N330-337-101			Note 4
C26	33						N330K-330			
C27	22						N330K-220			
C28	15			SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	Note 3
C29	470	500		1469-00047	D6-471	5R5T47	811-471	MCB245	MS-347	
C30	. 047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	Note 3
C31	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	Note 5
C32	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C33	4. 7			NPO-DI4. 7	TCZ-4R7	Z010	NPOA-4R7	ZT-5547	5TCCB-V47	
C34	10			BPD-00001	DD-100	G018	831-100	UC-541	5GA-Q1	
C35	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	Note 6
C36	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C37	4. 7			NPO-DI4. 7	TCZ-4R7	Z010	NPOA-4R7	ZT-5547	5TCCB-V47	
C38	10			BPD-00001	DD-100	G018	831-100	UC-541	5GA-Q1	
C39	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C40	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C41A	100		♦	♦ PA-97-1	♦ PC-50	♦ 111TM1	♦ 1403-01	UC-531	♦ DT-1	
B	100							UC-531		
C42	100			BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C43	10000			BPD-01	DD-103	C082	811-01	DC-511	5HK-S1	
C44	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C45	. 033	400		BPD-03	DF-303	CUB6S33		PT6133	6TM-S33	
C46	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C47	. 047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C48	470			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C49	. 0047	200		SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C50	. 001	200		SI1000	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C51	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C52	. 047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C53	. 047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C54	. 047	600		BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C55	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	Note 3

Note 2. Some versions use 750MMF in this application.
Note 3. Not used in some versions.
Note 4. Some versions use 180MMF in this application.
Note 5. Some versions use 4700MMF in this application.
Note 6. Some versions use 1000MMF in this application.
♦ Items C41A, C41B, and R26 are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA David Bogen PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2Meg	½	V354	BT-78	A47F3-2Meg	Q18-139X	UT-451	Volume-Tapped at 1Meg
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A.
R2A	2Meg	½	V352A	AB-75	A47-2Meg-S	Q11-139	U-56	Treble
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R2A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R2A.
R3A	2Meg	½	V353	B-75	A47-2Meg-S	Q11-139	U-56	Bass
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA David Bogen PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R4	100KΩ			BTS-100K	
R5	100KΩ			BTS-100K	
R6	3300Ω	2		BTB-3300	
R7	220Ω			BTS-220	
R8	100KΩ			BTS-100K	
R9	22KΩ			BTS- 22K	
R10	1000Ω			BTS-1000	
R11	22KΩ			BTS-22K	
R12	1000Ω			BTS-1000	
R13	68Ω			BTS-68	
R14	68KΩ			BTS-68K	Note 1
R15	100KΩ			BTS-100K	
R16	1000Ω			BTS-1000	
R17	68Ω			BTS-68	
R18	330KΩ			BTS-330K	
R19	1000Ω			BTS-1000	
R20	470Ω			BTS-470	
R21	68Ω			BTS-68	
R22	3. 3Meg			BTS-3. 3Meg	
R23	680KΩ			BTS-680K	
R24	3. 3Meg			BTS-3. 3Meg	
R25	4. 7Meg			BTS-4. 7Meg	
R26	47KΩ		♦	BTS-47K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA David Bogen PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R27	3. 3Meg			BTS-3. 3Meg	
R28	220KΩ			BTS-220K	
R29	220KΩ			BTS-220K	
R30	4. 7Meg			BTS-4. 7Meg	
R31	150KΩ			BTS-150K	
R32	15KΩ			BTS-15K	
R33	33KΩ			BTS-33K	
R34	5600Ω			BTS-5600	
R35	220KΩ			BTS-220K	
R36	330Ω			BTS-330	
R37	220KΩ			BTS-220K	
R38	1200Ω 5%			BTS-1200 5%	Note 2
R39	330KΩ			BTS-330K	
R40	6800Ω			BTS-6800	
R41	330KΩ			BTS-330K	
R42	220Ω	2		BTB-220	
R43	100KΩ			BTS-100K	
R44	270Ω	2		BTB-270	
R45	100Ω	2		BTB-100	
R46	33Ω	2		BTB-33	
R47	33Ω	7			
R48	33Ω	7			

Note 1. Not used in some versions.
Note 2. Some versions use a 1500Ω ½W resistor in this application.
♦ Items R26, C41A, C41B are combined in one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	220VAC Tap ⑨ 150VAC Tap ⑧ 117VAC ⑦ .52A	120V ⑥ .086A								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	4KΩ	4Ω Tap ⑤ 2Ω			A-3028①				① Drill new mtg. holes.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	David Bogen PART No.	QUAM PART No.	RCA TYPE No.	
SP1	6"	PM	2-4Ω		6A1	229S1	
SP2	6"	PM	2-4Ω		6A1	229S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	David Bogen PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Sw. Ant. Coil	0Ω	0Ω	U308				
L2	Sw. RF Coil	0Ω		U310				
L3	Sw. Osc. Coil	0Ω		U309				Tapped
L4	BC Ant. Coil	11Ω	2.6Ω	U311				
L5	RF Coil	6.1Ω		U510				8.2 Microhenries, IRC Part #CL-1
L6	RF Coil	8.2Ω		U509	19-1005		4612	10 Microhenries, IRC Part #CL-1
L7	RF Coil	40Ω		U508		BC-549		
L8	BC RF Coil	2.8Ω		U307				
L9	RF Coil	8.2Ω		U509	19-1005		4612	10 Microhenries, IRC Part #CL-1
L10	RF Coil	6.1Ω		U510				8.2 Microhenries, IRC Part #CL-1
L11	BC Osc. Coil	2.3Ω		U303	14-1060 *	BC-381 ■	71-Osc. *	Tapped ⑨ .2Ω
L12	RF Coil	8.2Ω			19-1005		4612	10 Microhenries, IRC Part #CL-1
L13	1st IF Trans.	17Ω	17Ω	H297	16-6758	BC-352	12-C1	
L14	2nd IF Trans.	17Ω	17Ω	H297	16-6758	BC-353	12-C2	
L15	3rd IF Trans.	17Ω	17Ω	H297	16-6758	BC-353	12-C2	

* Use primary winding.
■ Use secondary winding.

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	David Bogen PART No.	NOTES
M1	Dial Light		#51
M2	Dial Light		#51
M3	Tuning Cap.	C628A	3 Gang (12-465MMF, 12-465MMF, 12-465MMF)
M4A	Switch Assy.	S414A	Push Button (Slide Type) Band 1 Selection
B	Switch Assy.		Push Button (Slide Type) Band 2 Selection
C	Switch Assy.		Push Button (Slide Type) Band 3 Selection
D	Switch Assy.		Push Button (Slide Type) Band 4 Selection
E	Switch Assy.		Push Button (Slide Type) Band 5 Selection
F	Switch Assy.		Push Button (Slide Type) Band 6 Selection
G	Switch Assy.		Push Button (Slide Type) Phono Selection
M5	Switch	S417	AC Line Selection (SP-8 Position, Rotary Type)
M6	Switch	S416	AC-DC (4 Pole-2 Position, Slide Type)
A10	Trimmer Cap.	C662	Osc., Band 6
A11	Trimmer Cap.	C661	Ant., Band 6
A12	Trimmer Cap.	C661	RF, Band 6
A13	Padder Cap.	C663	Osc., Band 1
A14	Padder Cap.	C663	Ant., Band 1
A15	Padder Cap.	C663	RF, Band 1
A16	Trimmer Cap.	C662	Osc., Band 1
A17	Trimmer Cap.	C662	Ant., Band 1
A18	Trimmer Cap.	C662	RF, Band 1
A19	Padder Cap.	C662	Osc., Band 2
A20	Padder Cap.	C662	Ant., Band 2
A21	Padder Cap.	C662	RF, Band 2
A22	Trimmer Cap.	C662	Osc., Band 2
A23	Trimmer Cap.	C662	Ant., Band 2
A24	Trimmer Cap.	C662	RF, Band 2
A25	Padder Cap.	C662	Osc., Band 3
A29	Padder Cap.	C662	Ant., Band 3
A30	Padder Cap.	C662	RF, Band 3
A28	Trimmer Cap.	C662	Osc., Band 3
A26	Trimmer Cap.	C661	Ant., Band 3
A27	Trimmer Cap.	C661	RF, Band 3
A34	Padder Cap.	C662	Osc., Band 4
A35	Padder Cap.	C662	Ant., Band 4
A36	Padder Cap.	C662	RF, Band 4
A31	Trimmer Band	C660	Osc., Band 4
A32	Trimmer Cap.	C661	Ant., Band 4
A33	Trimmer Cap.	C661	RF, Band 4
A40	Padder Cap.	C661	Osc., Band 5
A41	Padder Cap.	C661	Ant., Band 5
A42	Padder Cap.	C661	RF, Band 5
A37	Trimmer Cap.	C660	Osc., Band 5
A38	Trimmer Cap.	C661	Ant., Band 5
A39	Trimmer Cap.	C661	RF, Band 5

FIRESTONE MODELS 13-G-187, 13-G-188, 13-G-189, 13-G-190 (Code 280-5-21T35)

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FIRESTONE MODEL 13-G-189

TRADE NAME	Firestone Models 13-G-187, 13-G-188, 13-G-189, 13-G-190 (Code 280-5-21T35)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	105-115 Volts AC-60 Cycle
RATING	1.6 Amp. @ 115 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.75MC, Sound IF 22.25MC (Intercarrier)

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.
2. Remove 2 metal screws located behind the picture and channel selector knobs.
3. Remove 12 wood screws. Remove rear cover.
4. Place receiver face down on a soft surface.
5. Remove 2 wood screws from interlock bracket.
6. Disconnect 5 yoke leads, speaker leads, picture tube socket and HV lead.
7. Remove 4 chassis bolts. Remove chassis.
8. Remove 4 speaker nuts. Remove speaker.

MODELS	CODE
13-G-187, 13-G-188, 13-G-189, 13-G-190	280-5-21T35

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet above and slightly to the left of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to the set. Adjustment is located on tube side of chassis. Set the horizontal hold control to the center of its range and adjust the horizontal oscillator slug (L24) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz control (R7) located on top of the chassis for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

HORIZONTAL SIZE CONTROL

The horizontal size control is located on the neck of the picture tube in form of a brass sleeve and slides between the yoke and picture tube. Push sleeve into yoke to decrease size and pull out to increase size.

FIRESTONE MODELS 13-G-187, 13-G-188, 13-G-189, 13-G-190 (Code 280-5-21T35)

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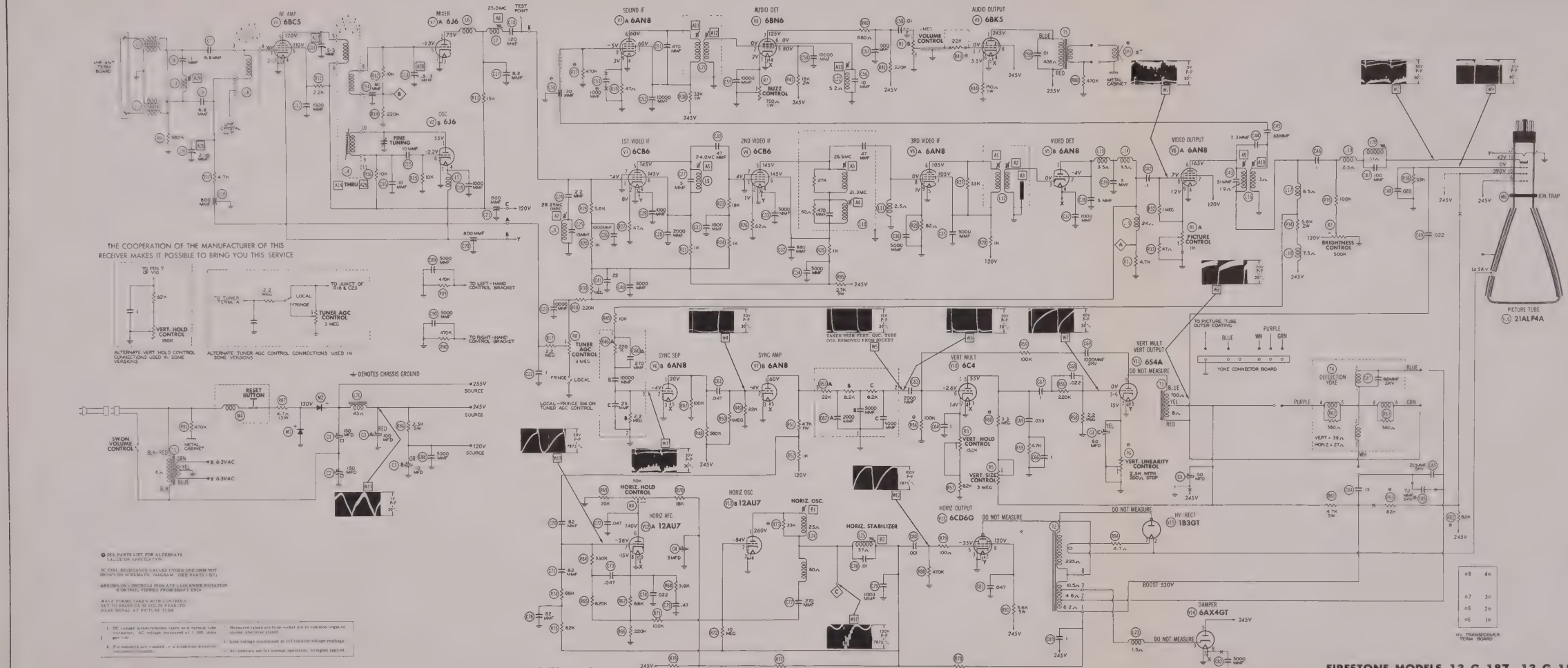

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FIRESTONE MODELS 13-G-187, 13-G-188, 13-G-189, 13-G-190 (Code 280-5-21T35)

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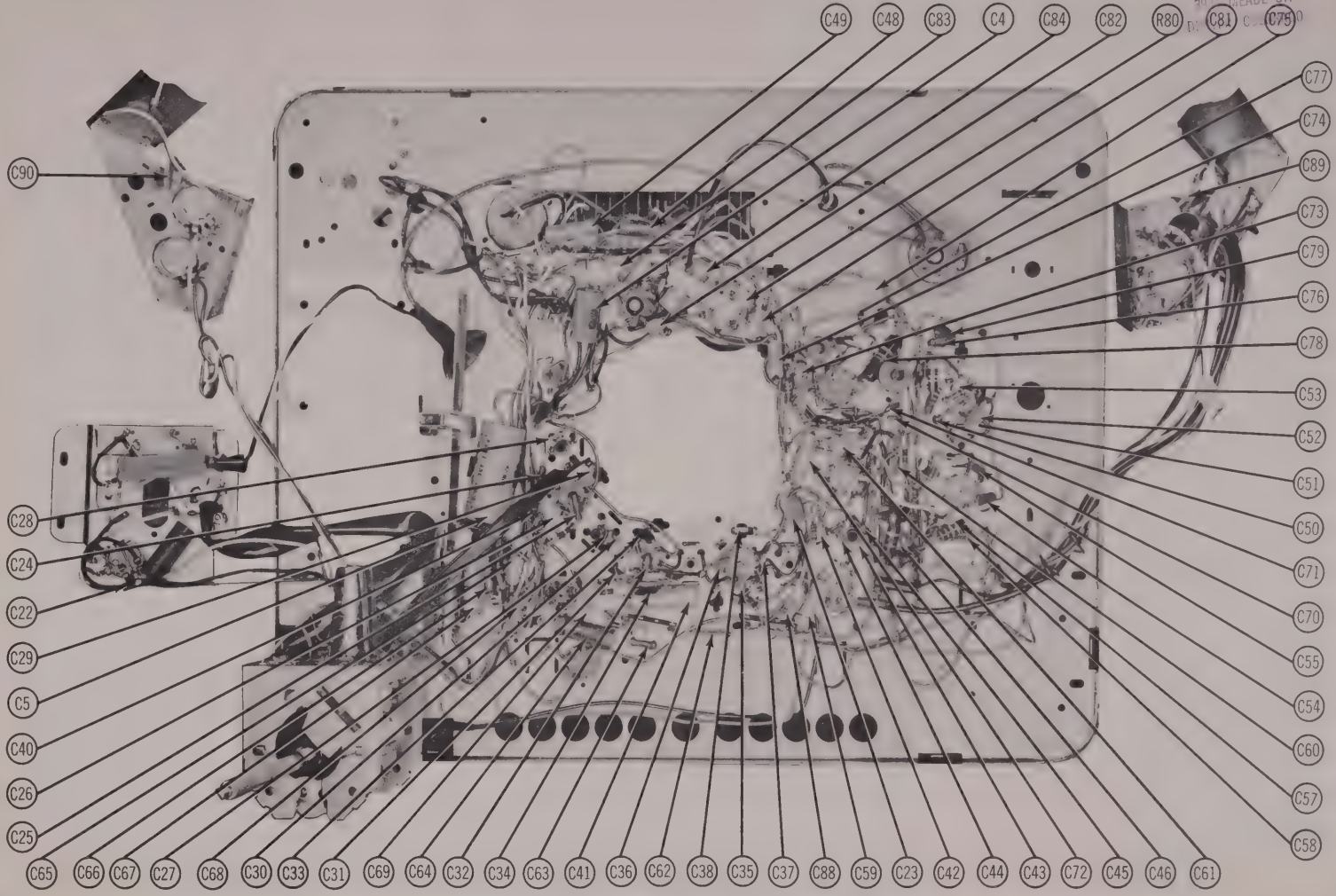
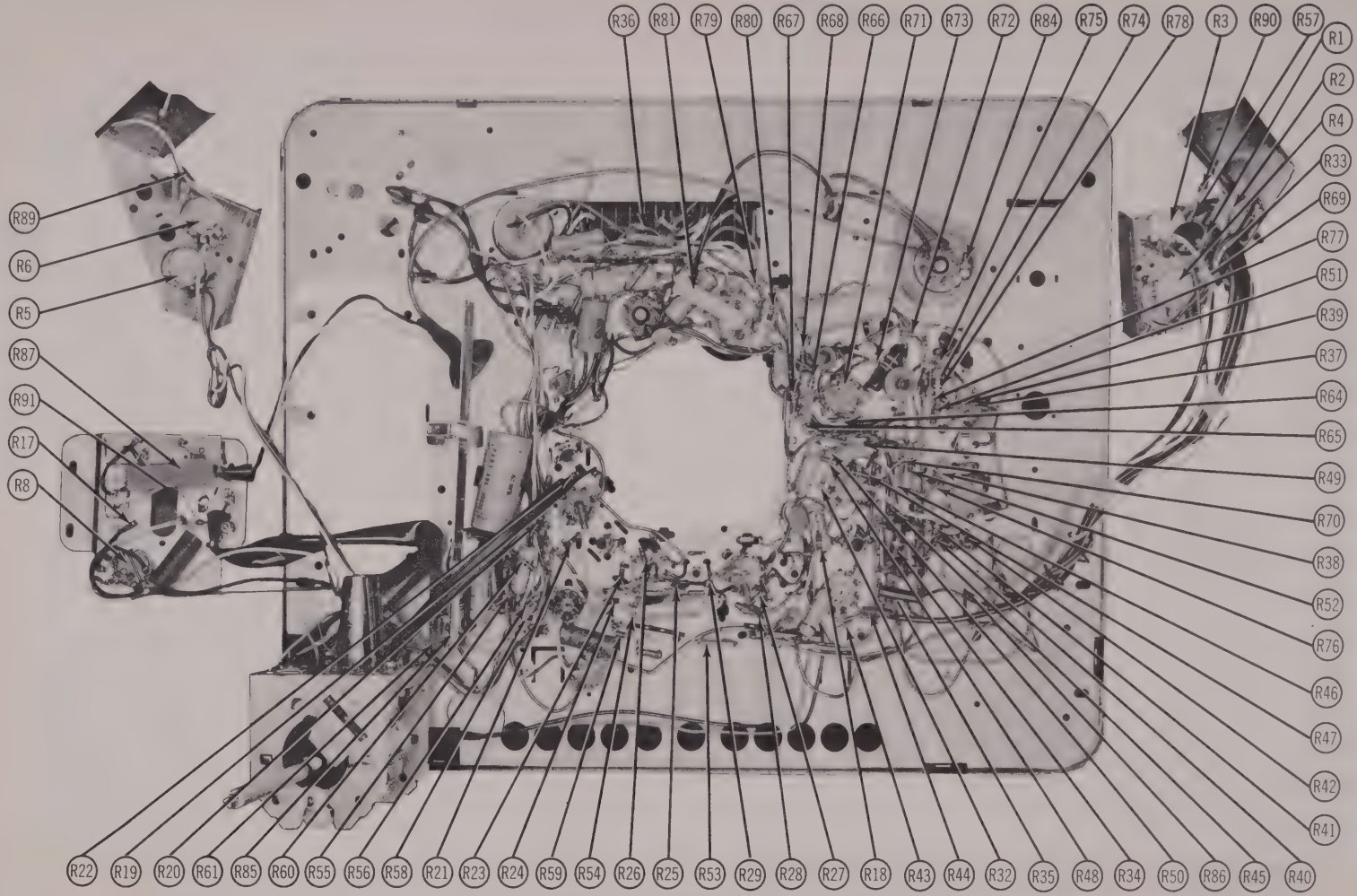


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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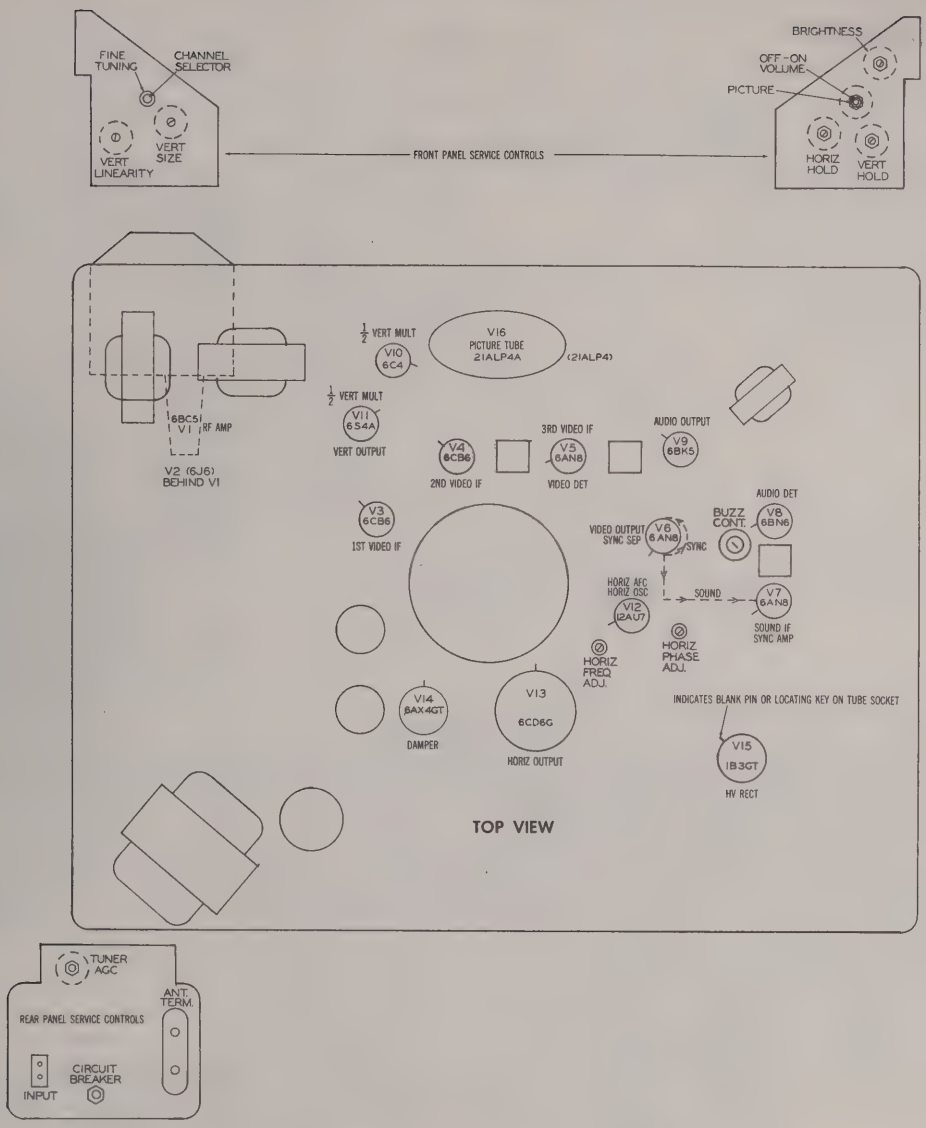
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2), Circuit Breaker (M4)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V16**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V7, V10, V11**
No horiz. sync - **V7, V12**
No vert. or horiz. sync - **V6, V7**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16**
No vertical deflection - **V10, V11**
Poor vert. linearity or foldover - **V10, V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, M1, M2**
Vert. off freq. - **V7, V10, V11**
Horiz. off freq. - **V7, V12**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped away from the chassis. Dot not remove the horizontal oscillator tube (V12) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 8 (grid) of 6AN8 (V5). Low side to chassis.	25MC (10MC Swp.)	23.9MC 26.3MC	Any	Vert. amp. thru 10KΩ to point (A). Low side to chassis.	A1, A2, A3	Connect a short jumper from pin 5 (plate) to pin 6 (screen) of 6CB6 (V4). Adjust for response similar to Fig. 1 with markers at 90%. A3 is a coupling rod and affects bandwidth. Remove short from pin 5 to pin 6 of V4.
2.	Direct	High side to an unground ed tube shield floating over converter tube. Low side to chassis.	Not used	21.3MC Unmod.	"	Use VTVM DC probe to point (A). Common to chassis.	A4	Adjust for maximum deflection.
3.	"	"	"	26.5MC	"	"	A5	Adjust for maximum deflection. Repeat step 2.
4.	"	"	"	24.0MC	"	"	A6	Adjust for maximum deflection. Attenuate generator to maintain not more than 2 volts deflection on VTVM.
5.	"	"	"	28.25MC	"	"	A7	Adjust for MINIMUM deflection.
6.	"	"	"	25.0MC	"	"	A8	Adjust for maximum reading. Attenuate generator to maintain not more than 2 volts deflection on VTVM. Repeat step 5.
7.	"	"	25MC (10MC Swp.)	21.3MC 23.8MC 26.65MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response similar to Fig. 2. Rock A8 for flat response. Increase sweep generator output and use high scope gain to view 22.25MC trap region. Adjust A4 so that 21.25MC appears at peak of pop-up portion proceeding trap notch. 22.25MC should fall in trap notch. If response is not similar to Fig. 2, repeat steps 1 thru 7.

SOUND IF ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket. Tune in a TV signal and adjust the fine tuning control until sound bars just appear in the picture. Adjust A9 fully counter clockwise, and then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning control for clearest picture and best sound. Insert an attenuator in series with the antenna and the receiver antenna terminals so that signal strength may be varied from weak to strong. If a suitable attenuator is not available stray feed the signal to the set by placing the antenna lead-in near the antenna terminals of the receiver.
Reduce the signal input to the receiver so that the signal falls below the limiting level of the 6BN6 limiter-detector as evidenced by a "hiss" in the sound. Adjust the secondary of the sound take-off transformer (A10), the sound if transformer (A11 and A12), the quadrature coil (A13) and the buzz control (R7) for maximum sound and minimum buzz. If hiss disappears during adjustments, increase attenuation until hiss reappears.

OSCILLATOR ALIGNMENT

The channel oscillator adjustment screws are reached through a hole just to the left of the fine tuning shaft. The correct oscillator adjustment screw is accessible through this hole as the channel switch is turned to each channel. Connect the negative lead of a 1.5 volt bias battery to the ungrounded side of C41. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp.)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 3. Use high scope gain and increase sweep generator output to view trap region. Video marker should fall at 50% on response curve.
			213MC (10MC Swp.)	211.25MC 215.75MC	13		A15	
			207MC (10MC Swp.)	205.25MC 209.75MC	12		A16	
			201MC (10MC Swp.)	199.25MC 203.75MC	11		A17	
			189MC (10MC Swp.)	187.25MC 191.75MC	9		A18	
			183MC (10MC Swp.)	181.25MC 185.75MC	8		A19	
			177MC (10MC Swp.)	175.25MC 179.75MC	7		A20	
			85MC (10MC Swp.)	83.25MC 87.75MC	6		A21	
			79MC (10MC Swp.)	77.25MC 81.75MC	5		A22	
			69MC (10MC Swp.)	67.25MC 71.75MC	4		A23	
			63MC (10MC Swp.)	61.25MC 65.75MC	3		A24	
			57MC (10MC Swp.)	55.25MC 59.75MC	2		A25	

ALIGNMENT INSTRUCTIONS (cont)

RF AND MIXER ALIGNMENT

Leave bias battery connected as under "Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp.)	193. 25MC 197. 75MC	10	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A26, A27, A28	Adjust for response similar to Fig. 4 with markers at 90%.
10.	"	"	69MC (10MC Swp.)	67. 25MC 71. 75MC	4	"		Check for response similar to Fig. 4. If markers fall below 70% on any channel, make SLIGHT compromise adjustments of A26, A27 and A28 with channel selector set for that channel. Recheck all other channels to make sure they have not been seriously affected.
			213MC (10MC Swp.)	211. 25MC 215. 75MC	13			
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12			
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11			
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5			
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2			
11.	"	"	Not used	105MC	2	Use VTVM DC probe to point (A). Common to chassis.	A29	Adjust for MINIMUM deflection.

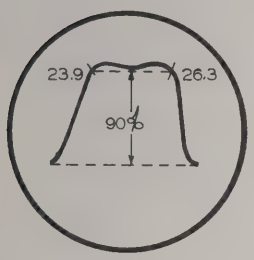


FIG.1

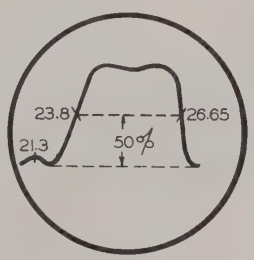


FIG.2

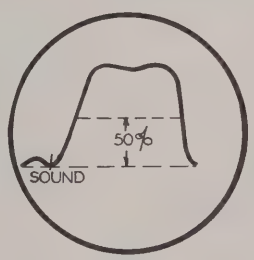


FIG.3

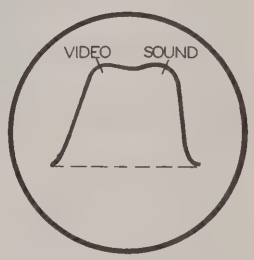
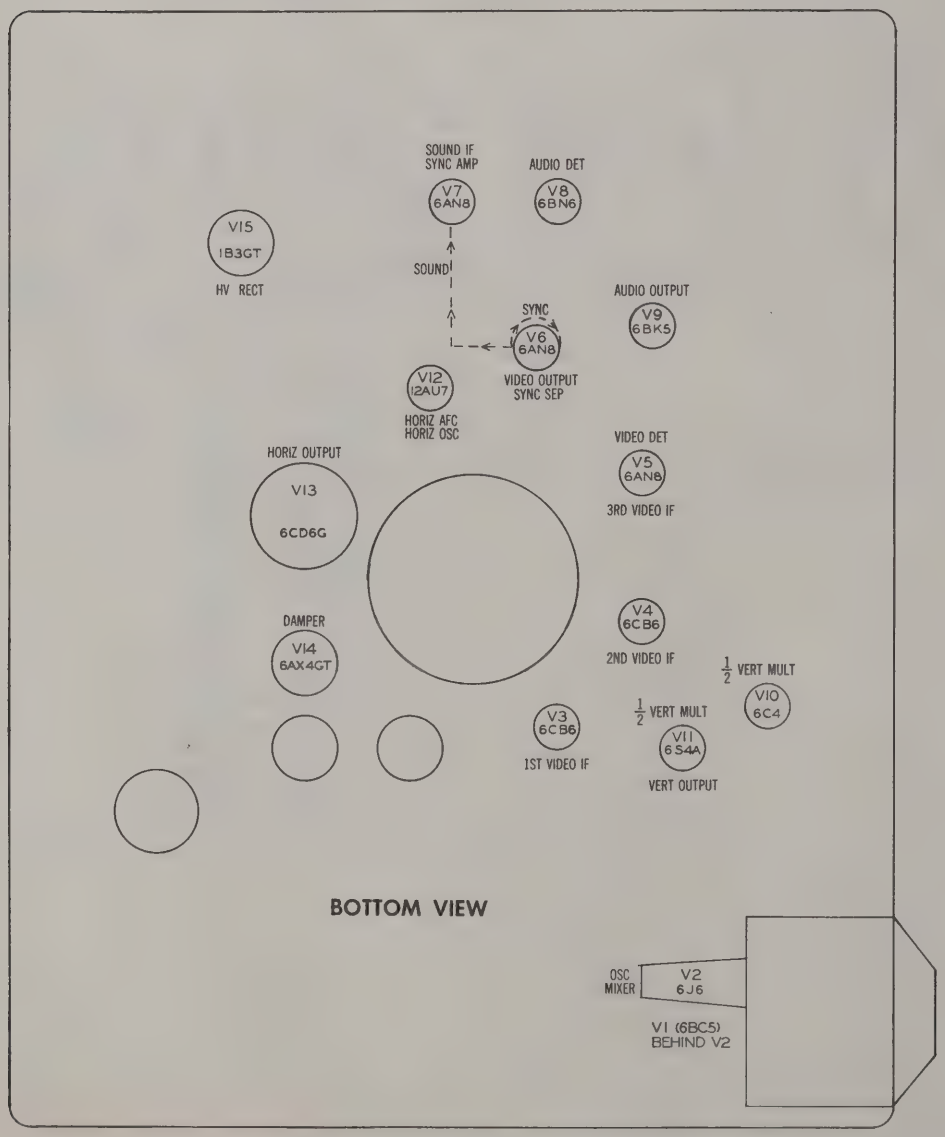


FIG.4

RESISTANCE MEASUREMENTS

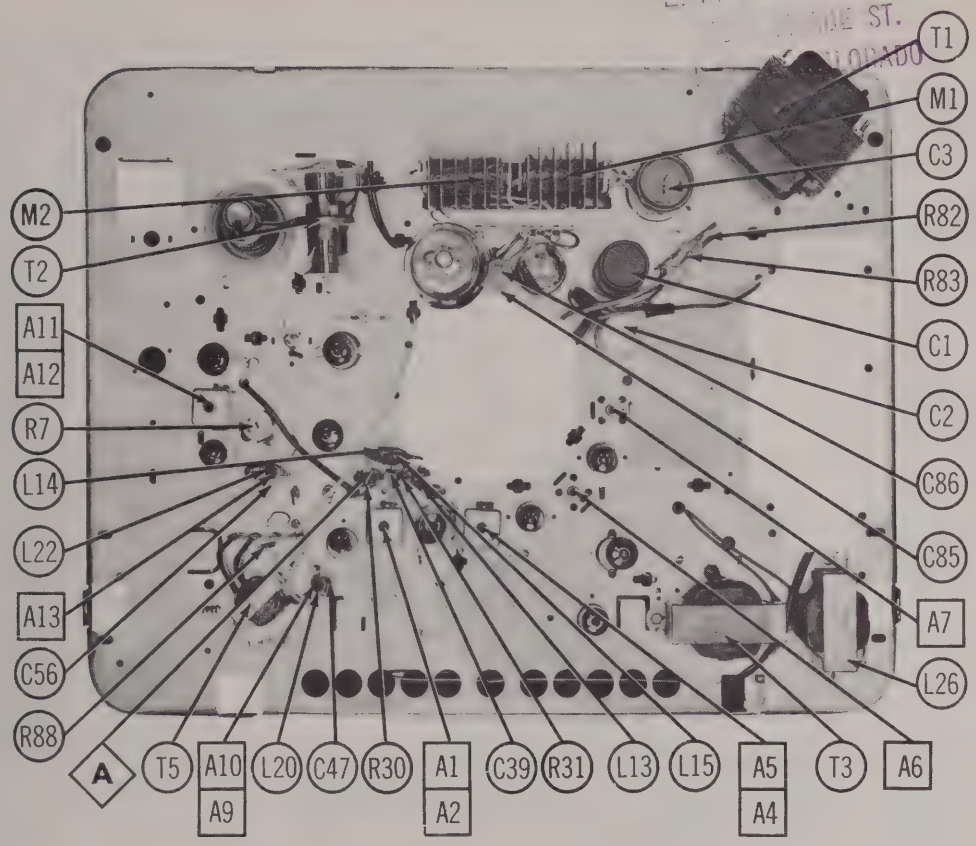
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	2.5Meg	0Ω	0Ω	.1Ω	† 2.5KΩ	† 4.7KΩ	0Ω		
V 2	6J6	† 13KΩ	† 18KΩ	0Ω	.1Ω	220KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	0Ω	.1Ω	† 3.7KΩ	† 3.7KΩ	0Ω		
V 4	6CB6	1Meg	62Ω	0Ω	.1Ω	† 3.7KΩ	† 3.7KΩ	0Ω		
V 5	6AN8	4.7KΩ	4.7KΩ	.2Ω	.1Ω	0Ω	† 3.5KΩ	† 3.5KΩ	2.5Ω	82Ω
V 6	6AN8	† 110KΩ	2.2Meg	0Ω	0Ω	.1Ω	† 5.6KΩ	† 2.5KΩ	1Meg	60Ω
V 7	6AN8	† 8.2KΩ	22KΩ	0Ω	0Ω	.1Ω	† 33KΩ	† 33KΩ	470KΩ	47Ω
V 8	6BN6	200Ω	.3Ω	0Ω	.1Ω	† 18KΩ	5.2Ω	† 220KΩ		
V 9	6BK5	† 435Ω	NC	120KΩ	.1Ω	0Ω	150Ω	120KΩ	† 45Ω	TP
V 10	6C4	▲ 4.5Meg	NC	.1Ω	0Ω	▲ 4.5Meg	100KΩ	130KΩ		
V 11	6S4A	NC	550Ω	2.2Meg	0Ω	.1Ω	2.2Meg	NC	NC	▲ 5.4KΩ
V 12	12AU7	† 30KΩ	320KΩ	0Ω	0Ω	0Ω	† 30KΩ	1.5Meg	300KΩ	.1Ω
V 13	6CD6G	TP	.1Ω	0Ω	TP	470KΩ	TP	0Ω	† 5.6KΩ	TOP CAP ▲ 12Ω
V 14	6AX4GT	TP	NC	70KΩ	NC	† 45Ω	NC	0Ω	.1Ω	
V 15	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 237Ω
V 16	21ALP4A	0Ω	33KΩ	PIN 6 † 45Ω	PIN 10 ▲ 50KΩ	PIN 11 † 200KΩ	PIN 12 .1Ω			

† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V14.
NC-NO CONNECTION
TP-TIE POINT

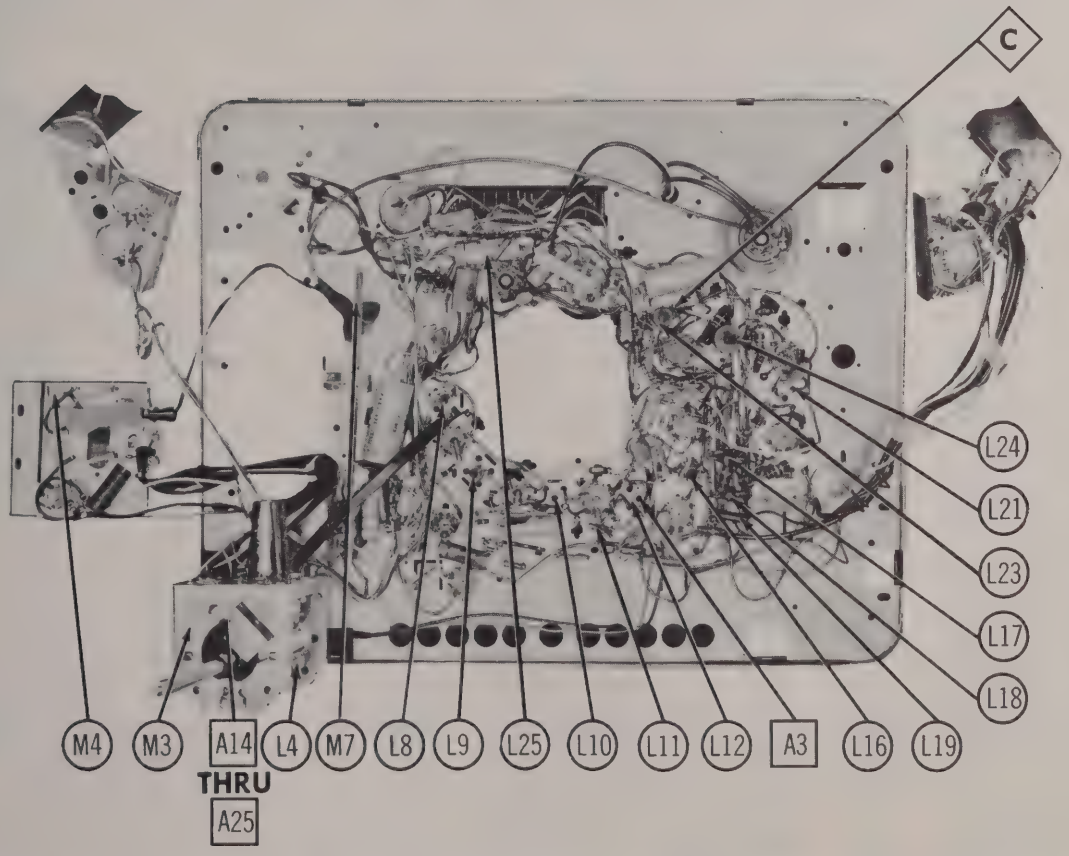


TUBE PLACEMENT CHART

PROPERTY OF
L. F. ELECTRONSHIP
[illegible] ST.
[illegible] COLORADO



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BC5	6BC5	
V2	Mixer-Oscillator	6J8	6J8	
V3	1st. Video IF Amp.	6CB6	6CB6	
V4	2nd. Video IF Amp.	6CB6	6CB6	
V5	3rd. Video IF - Video Det.	6AN8	6AN8	
V6	Video Output-Sync Sep.	6AN8	6AN8	
V7	Sound IF - Sync Amplifier	6AN8	6AN8	
V8	Audio Detector	6BH6	6BH6	
V9	Audio Output	6BK5	6BK5	
V10	Vert. Mult.	6C4	6C4	
V11	Vert. Mult.-Vert. Output	6S4A	6S4A	
V12	Horiz. AFC-Horiz. Osc.	12AU7	12AU7	
V13	Horiz. Output	6CD6G	6CD6G	
V14	Damper	6AX4GT	6AX4GT	
V15	HV Rectifier	1B3GT	1B3GT	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: FIRESTONE PART No	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
V16	21ALP4A ①	21ALP4A ① 21ALP4I 21ALP4B ②	21ALP4A ② ① 21ALP4 21ALP4A/B ② ②	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No
C1	⌀150	150	SC-22464	AFH-24	XA094	FP17	TM-150-150	T-050	TVL-1428
C2	⌀150	150	SC-22463	AFH-24	XA094	FP17	TM-150-150	T-050	TVL-1428
C3A	100	300	SC-23298	AFH3-99-75		FP536.8	TM-3127	T-537	TVL-3374
B	10	300						MT-0535	
C	50	50							
C4	5	300	SC-34174	PRS350V4	BR435	TC60	TD-5-390	FM-3908	TVA-1601
C5	50	350	SC-23522	PRS350V50	BR0335	TC68	TD-50-350	FM-4550	TVA-1613

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No	MALLORY PART No	SPRAGUE PART No.	NOTES
C6	.1		1SLSC6SR1	MPG-S21	TCZ-1	TZ03	MPGA-S10	ZT-5515	5TCCB-V1	
C7	6.8		1SLSC6SR1	MPG-DI5.8	TCZ-5R8	ZO15	MPGA-5R8	ZT-5569	5TCCB-V85	
C8	5.6		1SLSC5SR1	MPG-DI5.6	TCZ-5R6	ZO15	MPGA-5R6	ZT-5568	5TCCB-V80	
C9	2-10		31B-901		S20-10					
C10	500		1SM-5300EA- 102SC							
C11	.5-3		31B-902		S23-3			31L5-01-CR5	CT565A	
C12	1000			BPD-001	DD-102	KD69	501-001		5HK-D1	
C13	.5-3		31B-902		S23-3			31L5-01-CR5	CT565A	
C14	50		1SM-5300-500J							
C15	10		31LAQ10A							
C16	10		1SL8UA100D							
C17	8.2		1SL8CSR8D	MPG-DI8.2		Z6I6	MPGA-8R2			
C18	120		1SL8V12UK	BPD-0001Z	DD-121	G044	511-131	UC-5312	5GA-T12	
C19	1000			BPD-001	DD-102	KD69	501-001	DC-531	5HK-D1	
C20	680		1SM-5300EA- 102SC							
C21	800		1SM-5300EA- 102SC			ERIE				
C22	.1	200	8K-23084	P288N-1	DF-104	CUB2P1		PT601	2TM-P1	
C23	10000		8Q-30389	BPD-01	DD-103	KD83	511-01	DC-531	5HK-D1	
C24	2.2			NPO-S22.2	TCZ-2R2	TZ05	NPOA-2R2		5TCCB-V22	
C25	15			NPO-S15	TCZ-15	TZ1L	NPOK-150		5TCC-Q15	
C26	1000		8Q-13201	BPD-001	DD-103	KD69	501-001	DC-531	5HK-D1	
C27	5		8Q-13166	NPO-S5	TCZ-4R7	ZO1I	NPOA-050	ZT-555	5TCCB-V47	
C28	1000		8Q-18523	ED3000	DD-302	TP36	GP23-333-X03	UC-5326	5HK-D2	
C29	1000		8Q-13201	BPD-001	DD-102	KD69	501-001	DC-531	5HK-D1	
C30	47		8Q-18471	BPD-1547	DD-470	Z033	511-470	DC-5325	5HK-447	
C31	1000		8Q-13201	BPD-001	DD-102	KD69	501-001	DC-531	5HK-D1	
C32	680		8Q-21205	S1680	D6-681	TP50	GP23K-581	UC-5368	5GA-T68	
C33	5000		8Q-13963	BPD-005	DD-502	KD80	511-005	DC-535	5HK-D5	
C34	5000		8Q-13963	BPD-005	DD-502	KD80	511-005	DC-535	5HK-D5	
C35	5000		8Q-13963	BPD-005	DD-502	KD80	511-005	DC-535	5HK-D5	
C36	5000		8Q-13963	BPD-005	DD-502	KD80	511-005	DC-535	5HK-D5	
C37	1000		8Q-13201	BPD-001	DD-102	KD69	501-001	DC-531	5HK-D1	
C38	5		8Q-12166	NPO-S5	TCZ-4R7	ZO1I	NPOA-050	ZT-555	5TCCB-V47	
C39	5		8Q-12166	NPO-S5	TCZ-4R7	ZO1I	NPOA-050	ZT-555	5TCCB-V47	
C40	5000		8Q-13963	BPD-005	DD-502	KD80	511-005	DC-535	5HK-D5	
C41	.22	200	8K-23088	P288N-23		CUBP22		PT6023	2TM-P23	
C42	.1	200	8K-23084	P288N-1	DF-104	CUB2P1		PT601	2TM-P1	
C43	.1		8Q-23783							
C44	51		8Q-23783							
C45	3.3		8L-23251	NPO-S3.3	TCZ-3R3	TZ06	NPOA-3R3	ZT-5533	5TCCB-V33	
C46	33		8Q-19503	NPO-S33	TCZ-33	TZ1E	NPOL-330	ZT-5433	5TCC-Q33	
C47	.1	400	8K-23090	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C47	100		8N1-112	NPO-D100	D6-101	TZ30	NPO-337-101	ZT-531	5TCC-T1	
C48	.022	300	8K-23083	BPD-03	D3-303	CUB3Z2	511-03	PT6123	3TM-S22	
C49	.022	600	8K-23104	BPD-03	D3-303	CUB3Z2	511-03	PT6123	6TM-S22	
C50	30		14B-23772							Note 1
C51	470		8N1-121	1464-00047	D6-471	5R5T47	511-471	MC5345	10GA-T47	
C52	10000		8Q-30269	BPD-01	DD-103	KD82	511-01	DC-531	5HK-E1	
C53	1000		8Q-13201	BPD-001	DD-102	KD69	501-001	DC-531	5HK-D1	Note 3
C54	10000		8Q-30269	BPD-01	DD-103	KD80	511-01	DC-531	5HK-E1	
C55	10000		8Q-30269	BPD-01	DD-103	KD80	511-01	DC-531	5HK-E1	
C56	10		8Q-11799	MPG-D10	TCZ-10	TZ09	MPGA-100	ZT-541	5TCC-Q1	
C57	1000		8Q-13201	BPD-001	DD-102	KD69	501-001	DC-531	5HK-D1	
C58	.01	600	8K-23091	BPD-01	DD-103	GP23-333-103		PT611	6TM-S1	
C59	.01	600	8K-23103	BPD-01	DD-103	CUB3S1	GP3-333-103	PT611	6TM-S1	
C59A	270			BPD-00237		TP41	511-271	UC-5327	5GA-T27	
B	10000			BPD-01	†PC-363	KD83	511-01	DC-511	5HK-E1	
C	25			BPD-000025		TP25	531-250	UC-5425	5GA-G25	
C61	.047	200	8K-23083	BPD-06	DF-503	CUB2S47		PT6147	2TM-S47	
C62A	2000							DC-525	5HK-C2	
B	5000		⌀17A-22376	⌀PA-100	⌀PC-100	⌀1I5TM1	⌀1406-01	DC-535	⌀V-1	
C	5000							DC-535		
C63	2000			SI2000	D6-202	TP36	GP3-333-202	UC-5323	5HK-D2	
C64	.1	200	8K-23084	P288N-1	DF-104	CUB2P1		PT601	2TM-P1	
C65	.025	400	8K-23085			CUB2S25				
C66	.1	200	8K-23084	P288N-1	DF-104	CUB2P1		PT601	2TM-P1	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No	MALLORY PART No	SPRAGUE PART No	NOTES
C67	.1	400	8K-23095	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C68	.022	200		BPD-03	DD-303	CUB3Z2	817-02	PT4123	2TM-P23	
C69	1000	3000	8Q-34991	BPD-03	HVD30-1000	DD30-102	VYDU	3KV-102	DC3091	30GA-D1
C70	82		8N1-112	1469-000082	D6-820	Z040		801-820		10GA-Q82
C71	82		8N1-112	1469-000082	D6-820	Z040		801-820		10GA-Q82
C72	.047	400	8K-23094	BPD-04	DF-503	CUB4S47		PT6147	4TM-S47	
C73	.047	300	8K-23083	BPD-05	DF-503	CUB3S47		PT6147	2TM-S47	
C74	.022	200	8K-23082	BPD-02	DD-303	CUB4S22	817-02	PT4123	2TM-S22	
C75	.47	400	8K-23087	P488N-47		CUB4P47		PT4047	4TM-P47	
C75	82		8N1-112	1469-0000S2	D6-820	Z040		801-820	10GA-Q82	
C77	270		8N1-116	1469-00027	D6-371	T240	511-271	MC241	10GA-T27	
C78	.01	600	8K-24439							
C79	1000		8N3-125	1464-001			1R5D1	511-102	MC3255	3G3-21
C80	.001	600	8K-23099	S11000	D6-102	CUB3D1	GP2L-102	PT621	6TM-D1	
C81	.047	400	8K-23094	BPD-05	DF-503	CUB4S47		PT6147	4TM-S47	
C82	5000			BPD-005	DD-502	KD80	511-005	DC-535	5HK-D5	Note 2
C83	.1	600	8K-23106	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C84	.15	200	8K-23085	P288-15		CUB2P15		PT4015	2TM-P15	
C85	120	5000	⌀⌀⌀⌀⌀1			DD60-121				Note 2
C86	72	5000								
C87	68	2000			HVD-30-68	DD30-680	VZQ68	3KV-680	DC30468	30GA-Q68
C88	5000		8Q-13963	BPD-005	DD-502	KD80	511-005	DC-525	5HK-D5	
C89	5000		8Q-13963	BPD-005	DD-502	KD80	511-005	DC-525	5HK-E5	
C90	5000		8Q-13963	BPD-005	DD-502	KD80	511-005	DC-525	5HK-D5	

Note 1. C50 is the capacity of the sound IF coupling shielded lead.
Note 2. Not used in some versions.
† Items C80A, C65B, C66C, R46A and R46B are combined in one unit.
⌀ Items C62A, C62B, C62C, R55A, R55B and R55C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FIRESTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	B10A-35103	F1-5	RTV-573	*Q2-907	UF15L) †	Picture (Panel)
B	1Meg	½		E2-53			UR16A) †	Volume (Rear)
C	Switch			KB-1			UR-28	Attach to R1B.
R2A	500KΩ	½	B10B-25105	AB-59	A47-500K-S	Q11-153	U-50	Brightness
B	Shaft		Not Req.	AK-4	KSB-3	Not Req.	Not Req.	Attach to R2A.
R3A	150KΩ	½	B10B-25155	AB-48	A47-150K-S	Q11-153	U-48	Vert. Hold
B	Shaft		Not Req.	AK-4	KSB-3	Not Req.	Not Req.	Attach to R3A.
R4A	50KΩ	½	B10B-25159	AB-31	A47-50K-S	Q11-153	U-35	Horiz. Hold
B	Shaft		Not Req.	AK-4	KSB-3	Not Req.	Not Req.	Attach to R4A.
R5A	3Meg	½	B10B-25167	B-94	A47-3Meg-S	Q11-140	U059	Vert. Size
B	Shaft		Not Req.	Not Req.	Not Req.	KS2-3	Not Req.	Attach to R5A.
R6A	2500Ω with 200Ω step	½	B10B-25205	B-7	⌀ A47-2500-S	⌀ Q11-112	⌀ TA352L	Vert. Linearity
B	Shaft		Not Req.	Not Req.	KSB-3	Not Req.	Not Req.	Attach to R6A.
R7	750Ω	1	A10D-23857	39-750	A47-750-S		U-59	Buzz-Wire Wound
R8A	3Meg	½	B10A-25667	B-84-S	A47-3Meg-S	Q11-140	U-59	Tuner AGC
B	Shaft		Not Req.	Not Req.	KSB-3	Not Req.	Not Req.	Attach to R8A.
C	Switch		Not Req.	Not Req.	SW2-13	76-1	UR-38	Attach to R8A.

⌀ Connect a 220Ω resistor in series with the right hand terminals of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
† Universal Replacement (Mallory Exact Duplicate Part No. UE6TS).
⌀ Concentrikit Equivalent: R-3 Kit, Base Elements and Shafts; B17-108 & P1-225 (Panel)
B12-137 & R3-310 (Rear)
76-1 (Switch)

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	NOTES
R9	680Ω	½	9B1-30	BTS-680K	
R10	100Ω	½	9B1-70	BTS-4700	
R11	2200Ω	½	9B1-86	BTS-2200	
R12	150Ω	½	9B1-74		
R13	15KΩ	½	9B1-78		
R14	220KΩ	½	9B1-37	BTS-220K	
R15	10KΩ	½	9B1-74	BTS-10K	
R16	10KΩ	½	9B1-74		
R17	2.2Meg	½	9B1-103	BTS-2.2Meg	
R18	220KΩ	½	9B1-90	BTS-220K	
R19	5600Ω	½	9B1-71		
R20	1000Ω	½	9B1-62	BTS-1000	
R21	1000Ω	½	9B1-62	BTS-1000	
R22	47Ω	½	9B1-67	BTS-47	
R23	15KΩ	½	9B1-77		
R24	1000Ω	½	9B1-62	BTS-1000	
R25	1000Ω	½	9B1-62	BTS-1000	
R26	62Ω 5%	½	9B1-130	BTS-62	
R27	3.3KΩ	½	9B1-66		
R28	1000Ω	½	9B1-62	BTS-1000	
R29	82Ω	½	9B1-63	BTS-82	
R30	1Meg	½	9B1-98	BTS-1Meg	
R31	4700Ω	½	9B1-70	BTS-4700	
R32	1Meg	½	9B1-98	BTS-1Meg	
R33	47Ω	½	9B1-66	BTS-47	
R34	5600Ω	2	9B4-71	BTS-5600	
R35	100KΩ	½	9B1-88	BTS-100K	
R36	33KΩ	½	9B1-80	BTS-33K	
R37	470KΩ	½	9B1-92	BTS-470K	Note 1
R38	82KΩ	½	9B2-60	BTA-33K	Note 1
R39	47Ω	½	9B1-66	BTS-47	
R40	680Ω	½	9B1-30	BTS-680	
R41	220KΩ	½	9B1-90	BTS-220K	
R43	15KΩ	2	9B4-77	BTP-15K	
R44	22KΩ	½	9B1-76	BTS-22K	Note 3
R44	150Ω	2	9B2-52	BTA-150	
R45	10KΩ	½	9B1-74	BTS-10K	
R46A	220KΩ	½	† 17A-24213	BTS-220K	
B	2.2Meg	½		BTS-2.2Meg	
R47	100KΩ	½	9B1-88	BTS-100K	
R48	560KΩ	½	9B1-95	BTS-560K	
R49	22KΩ	½	9B1-76	BTS-22K	
R50	1Meg	½	9B1-98	BTS-1Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	NOTES
R51	4700Ω	½	9B1-70	BTS-4700	
R52	100Ω	½	9B1-63	BTS-100	
R53A	22KΩ			BTS-22K	
B	2300Ω		⌀ 17A-22276	BTS-2300	
C	2200Ω			BTS-2200	
R54	100KΩ	½	9B1-86	BTS-100K	Note 3
R55	4700Ω	½	9B1-70	BTS-4700	
R56	220KΩ	½	9B1-86	BTS-220K	
R57	82KΩ	½	9B1-80	BTS-82K	
R58	2.2Meg	½	9B1-102	BTS-2.2Meg	
R59	100KΩ	½	9B1-86	BTS-100K	
R60	3.3Meg	½		BTS-3.3Meg	Note 4
R61	4700Ω	½	9C12-1107		
R62	560Ω	½	9B1-59		
R63	560Ω	½	9B1-59		
R64	330KΩ	½	9B1-92		
R65	220KΩ	½	9B1-97	BTS-220K	
R66	220KΩ	½	9B1-90		
R67	82KΩ	½	9B1-84		
R68	2200Ω	½	9B1-59		
R69	39KΩ	½	9B1-81	BTS-39K	
R70	10KΩ	½	9B1-77		
R71	100KΩ	½	9B1-86	BTS-100K	
R72	10Meg	½	9B1-110		
R73	33KΩ	½	9B1-80		Note 5
R74	68KΩ	½	9B1-84		
R75	82KΩ	½	9B1-85		
R76	4700Ω	½	9B1-17		
R77	33KΩ	½	9B1-80		
R78	82KΩ	1	9B2-85		
R79	100Ω	½	9B1-50	BTS-100	
R80	470KΩ	½	9B1-94		
R81	560Ω	½	9C13-1108		
R82	82K	½	9B1-85	BTS-82K	Note 2
R83	82K	½	9B1-85	BTS-82K	Note 2
R84	4.7Ω	½	9C1-107	BW1-4.7	
R85	3700Ω	3	9C11-1104		
R86	2500Ω	5	9C-24033	PWT-2500	
R87	4.7Ω	15	9C-25668		
R88	470KΩ	½	9B1-39	BTS-470K	
R89	470KΩ	½	9B1-39	BTS-470K	
R90	470KΩ	½	9B1-39	BTS-470K	
R91	470KΩ	½	9B1-39	BTS-470K	

Note 1. Some versions use a 100KΩ ½W resistor in this application.
Note 2. Not used in some versions.
Note 3. Some versions use a 47KΩ ½W resistor in this application.
Note 4. Some versions use a .7Meg ½W resistor in this application.
Note 5. Some versions use a 68KΩ ½W resistor in this application.
† Items R46A, R46B, C80A, C80B, C80C are combined in one unit.
⌀ Items R53A, R53B, R53C, C62A, C62B, C62C are combined in one unit.

TRANSFORMER (FILAMENT)

ITEM No.	RATING: PRI	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: FIRESTONE PART No	Hallicrafters PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	105VAC @ 6A	12.6VCT @ 4.65A			12D-25563	PS605 ②	P3085 ③		21F34 ③	F-42A ③

① Parallel and phase 12.6V windings.
② Connect 6.3V ② 2A in series and phase, tape 6. TVCT.
③ Parallel and phase 3-12V ③ 3A windings to obtain 12V ③ 6A.
④ Drill new mounting holes.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	Hallicrafters PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Horiz. Output Trans.	12E-25433	FB643 *	HVO-58 *		3126 *		FLT-80 *	D-83 *
T3	Vert. Output Trans.	12E-19040-2	21900 ①	A-3038 ①	22271 ③	V305 ①	A-8143 ①	26653 ①	A-99X ①
T4A	Yoke (90°) Horiz. (18.5MH)	30I-35260	DF607 ③	MDF-23 ③	23SD1 ③	Y90F19/43 ③	DY-16A ③	Y-16 ③	Y-41-1 ③
B	Vert. (38MH)	18M-23770 ④							

① Connect as auto transformer.
② Use 10 to 1 horns ratio.
③ Drill new mounting hole(s).
④ Yoke rear cover and centering device.
⑤ Use new original rear cover and centering device.
⑥ Loosen and rotate core clamp to duplicate original shield mounting
⑦ Connect horizontal damping network across terminals #3 and #7. Use original if necessary.
⑧ Use original horizontal yoke damping network if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL CONNECTIONS	Hallicrafters Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
8	8	8		8		8	8
3	3	3	6		6	6	3
2	3	3	6		6	6	3
1	8	8	2		2	2	8

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI	IMPEDANCE: SEC.	REPLACEMENT DATA: FIRESTONE PART No.	Hallicrafters PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T5	6.3KΩ	3-4Ω	12C-23704	21000 ①	A2931 ①	A3856 ①	26548 ①	S-7X ①	① Drill one new mtg. hole.

SPEAKER

ITEM No	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: FIRESTONE PART No.	QUAM PART No	RCA TYPE No	NOTES
SP1	6"	PM	3-4Ω	16A-31433 ①	6AJ	22081	① Used in Models 13-G-189, 13-G-190
	5"	PM	3-4Ω	16A-24692 ②	5A07	20563	② Used in Models 13-G-187, 13-G-188

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: FIRESTONE PART No.	MEISSNER PART No	MERIT PART No	MILLER PART No	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω	31T-428				
L2	Ant. Matching Trans.	0Ω	0Ω	31T-428				
L3	IF Trap	.2Ω		31T-424				
L4A	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-33-CA				Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-33-CA				Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-34-CA				Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-35-CA				Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-36-CA				Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-37-AA				Channel 7
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-38-AA				Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-39-AA				Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-40-AA				Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-41-AA				Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-42-AA				Channel 13
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-43-AA				Channel 13
L5	Fil. Choke	1Ω						
L6	RF Coil	0Ω		31A-127-01				
L7	1st Video IF	.9Ω		31U-502				
L8	18.25MC Trap	.5Ω		13M-23686				
L9	2nd Video IF	.1Ω		20I-23829				
L10	3rd Video IF	.1Ω		30I-34043				Tapped-Includes resistors & caps.
L11	RF Choke	2.5Ω		20I-30266	18-3036	TV-120	6178	33 Microhenries
L12	4th Video IF	.9Ω	.3Ω	13B-23867				
L13	Series Peaking Coil	2.9Ω		16A-23933	18-3035		6183	23 Microhenries

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L14	Series Peaking Coil	3.5Ω		16A-22923	19-6022		6152	22 Microhenries
L16	Shunt Peaking Coil	24Ω		16A-19365	19-4400	TV-190	4648	410 Microhenries
L16A B	4.5MC Trap 1st Sound IF	1.9Ω 3Ω		201-23729				
L17	Series Peaking Coil	8.5Ω		16A-21391	19-3300		6155	305 Microhenries
L18	Shunt Peaking Coil	7.5Ω		16A-20970	19-3250	TV-185	6181	270 Microhenries
L19	Series Peaking Coil	2.5Ω		16A-24090	19-1005		4612	11 Microhenries
L20	4.5MC Trap	1.1Ω		16A-25441	20-1004	TV-151	1469	
L21	2nd Sound IF	.3Ω	.3Ω	201-23873				
L22	Quadrature Coil	5.2Ω		201-23727			1480	
L23	RF Choke	1.5Ω		16A-21701	19-1005		4612	8 Microhenries

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L24	85Ω		12E-24440			6212				Horiz. osc. tapped @ 60Ω, core part #51A-24699
L25	37Ω		13M-24441			6314				Horiz. stabilizer core part #51A-24699

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L26	.290A	45Ω	L.5HY	16B-25146	C5037①	C2996 ①	C2326 ①	26C44	C-17X ①

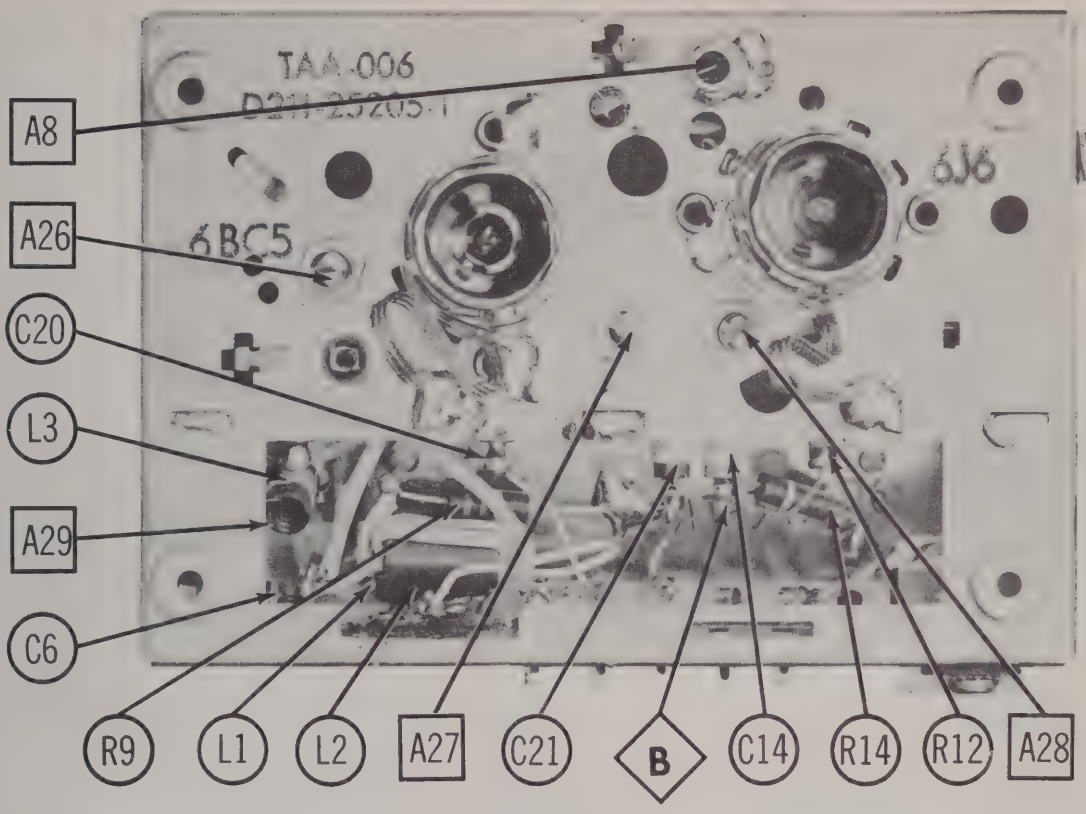
① Drill one new mounting hole.

SELENIUM RECTIFIER

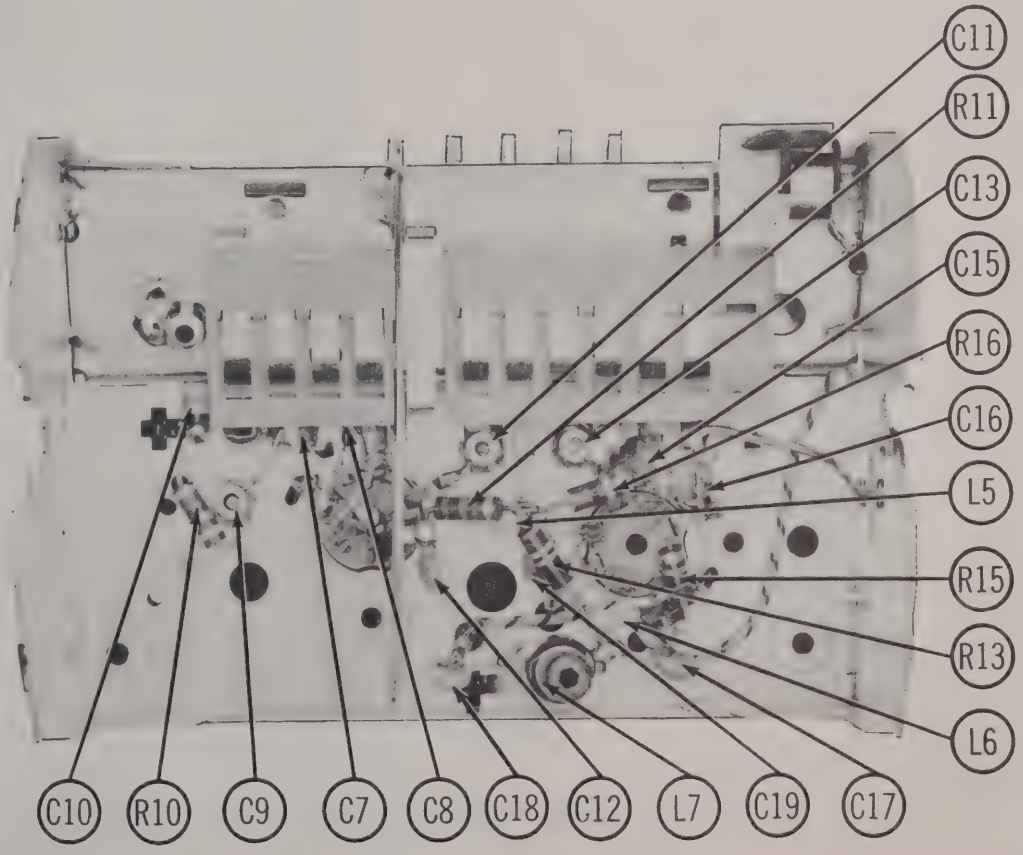
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	FIRESTONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.320A DC	21J25315	1241A	MR350	6S350	6QA2	350A	
M2	.320A DC	21J25315	1241A	MR350	6S350	6QA2	350A	

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M3	Tuner	D21I-25205-1	VHF (Pentode)
M4	Circuit Breaker	20F-25568	Low voltage protection
M5	Centering Device	16M-23770	Includes deflection yoke (T4) rear cover
M6	Ion Trap	16M-19705	
M7	Correction Magnet	B16M-22873	
	Cabinet	200-25382	Model 13-G-189
	Cabinet	200-25382-1	Model 13-G-190
	Cabinet	200-25381	Model 13-G-187
	Cabinet	200-25381-1	Model 13-G-188
	Cabinet	5B-25184-A56	Station selector
	Knob	5B-25177-A29	Fine tuning
	Knob	5B-25183-A56	On-off-volume
	Knob	5B-25178-A29	Picture
	Knob	5B-25176-A29	Control (3 used)
	Safety Glass	30M-25204	



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Turn the horizontal hold control (R4) to its mid-range position.

Connect a short clip lead across L25) Adjust horizontal oscillator slug (B1) until the picture synchronizes horizontally. Remove clip lead from L25. Connect the vertical amplifier of the oscilloscope thru a low capacity probe to point ◇. Low side to chassis. Adjust the horizontal stabilizer coil slug (B2) until a waveform similar to Fig. 5 is obtained. While making this adjustment, keep the picture in sync with the horizontal hold. Remove scope connection. Check range of horizontal hold control (R4). Turn R4 fully counter clockwise then back clockwise. The picture should fall out of sync at each extreme setting of R4.

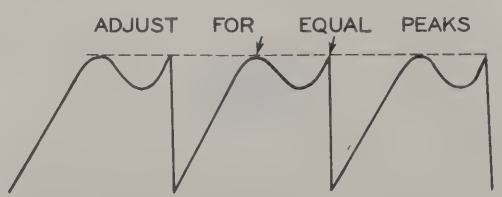
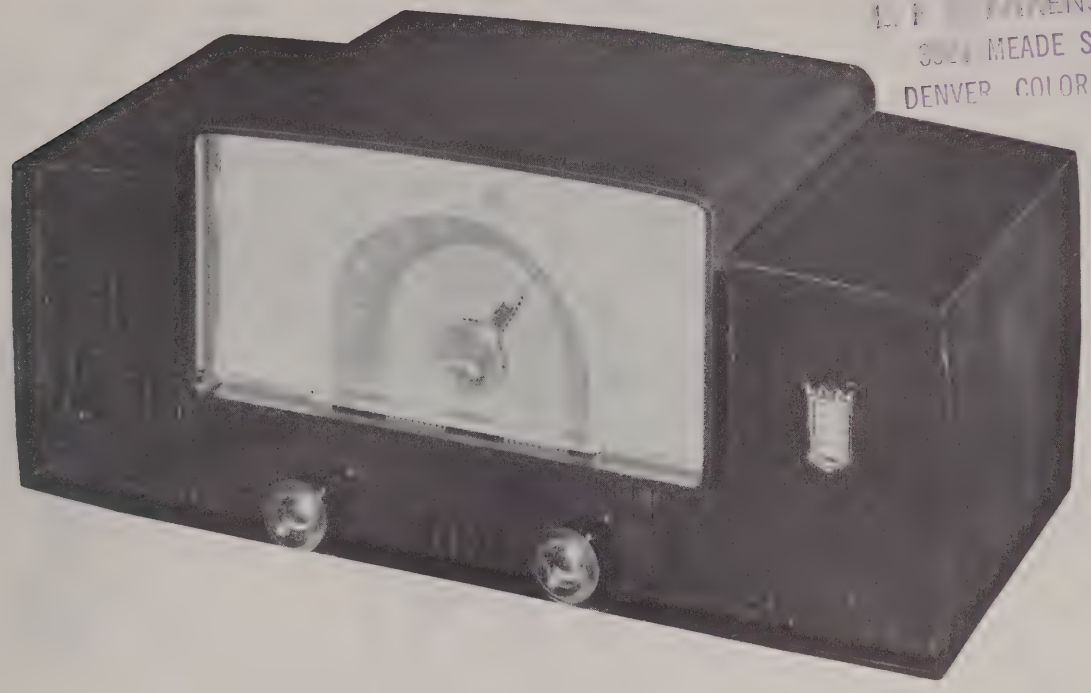


FIG. 5

PROPERTY OF
L. F. SMAKENSHIP
3824 MEADE ST.
DENVER COLORADO



GENERAL ELECTRIC
MODELS 465, 466, 467

TRADE NAME	General Electric Models 465, 466, 467
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N. Y.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det. -AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-DC
RATING	.25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	Tune to 1500KC signal		A6	Adjust for maximum output while rocking tuning gang.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amp.	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	RCE-200	PRS150V30-50	BBRD5315	TCD497	TDL-5030-150	FMD-301	TVA-2450
B	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	G. E. PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	400	UCC-045	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C3	47		RCW-3075							
C4A	400		♦RCW-3207	♦PA408						
B	2000									
C	220									
D	5000									
C5	.022	600	RCN-050	BPD-02	DD-203	CUB6S22	817-02	PT6122	6TM-S22	
C6	.047	600	RCN-053	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C7	.05	400	UCC-045	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	

♦ Items C4A, C4B, C4C, C4D, R6A, R6B, and R6C are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	G. E. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½	RRC-329	AB-60				Volume
B	Shaft		Not Req.	AK-4				Attach to R1A
C	Switch		Not Req.	KB-1				Attach to R1A.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

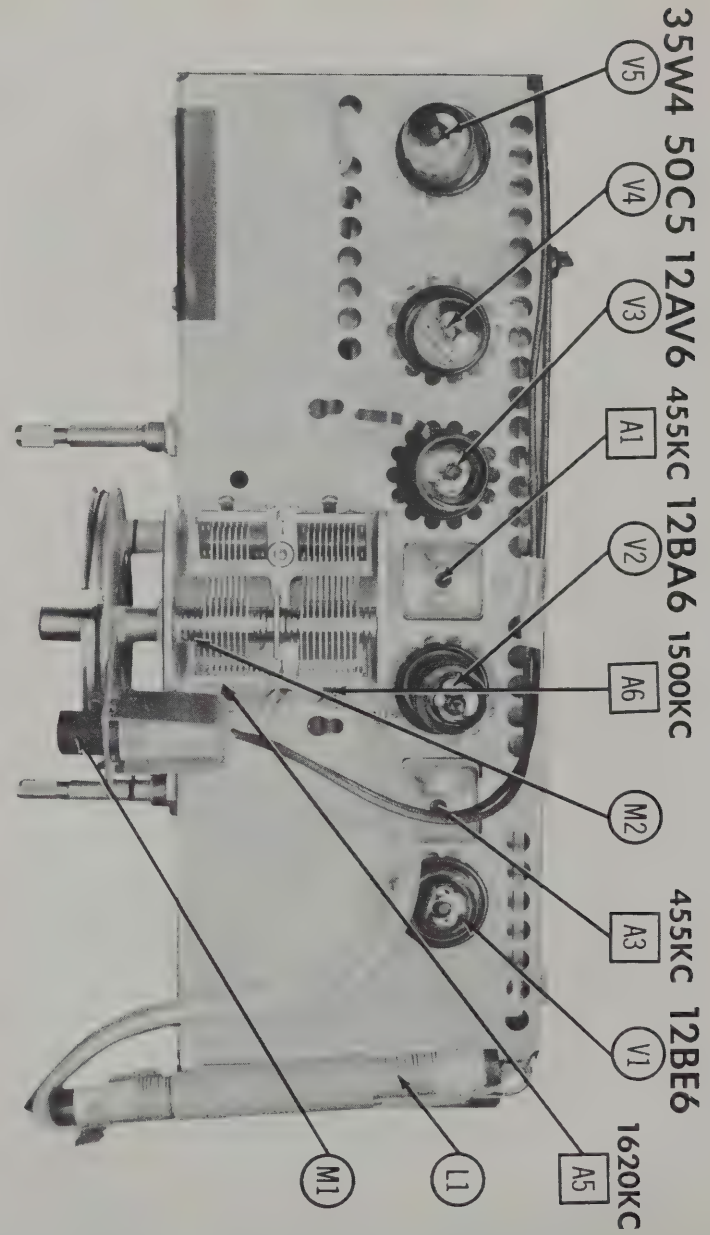
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	G. E. PART No.	IRC PART No.	
R2	22KΩ		URD-081	BTS-22K	
R3	100Ω		URD-025	BTS-100	
R4	68Ω		URD-021	BTS-68	
R5	2.2Meg		URD-129	BTS-2.2Meg	
R6A	6.8Meg		♦RCW-3207	BTS-6.8Meg	
B	470K			BTS-470K	
C	470K			BTS-470K	
R7	150Ω		URD-029	BTS-150	
R8	1500Ω	2	URF-053	BTB-1500	
R9	18Ω		URD-007	BTS-18	

♦ Items R6A, R6B, R6C, C4A, C4B, C4C, C4D are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	G. E. PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.6KΩ	3-4Ω	RTO-128	Z1101	A-3025	A-3332	26S58	S-12X	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

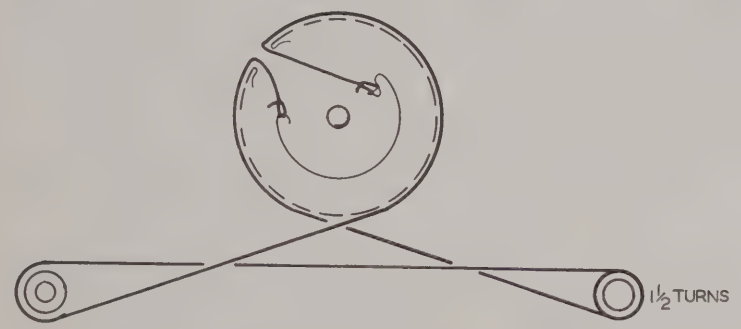
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	G. E. PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	ROP-027	4A07	223S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	G. E. PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	.3Ω		RLL-055				
L2	Osc. Coil	.8Ω	6.8Ω	RLC-122				
L3	Input IF	30Ω	30Ω	RTL-163	16-6758	BC-352	12-C1	
L4	Output IF	30Ω	30Ω	RTL-163	16-6758	BC-353	12-C2	

MISCELLANEOUS

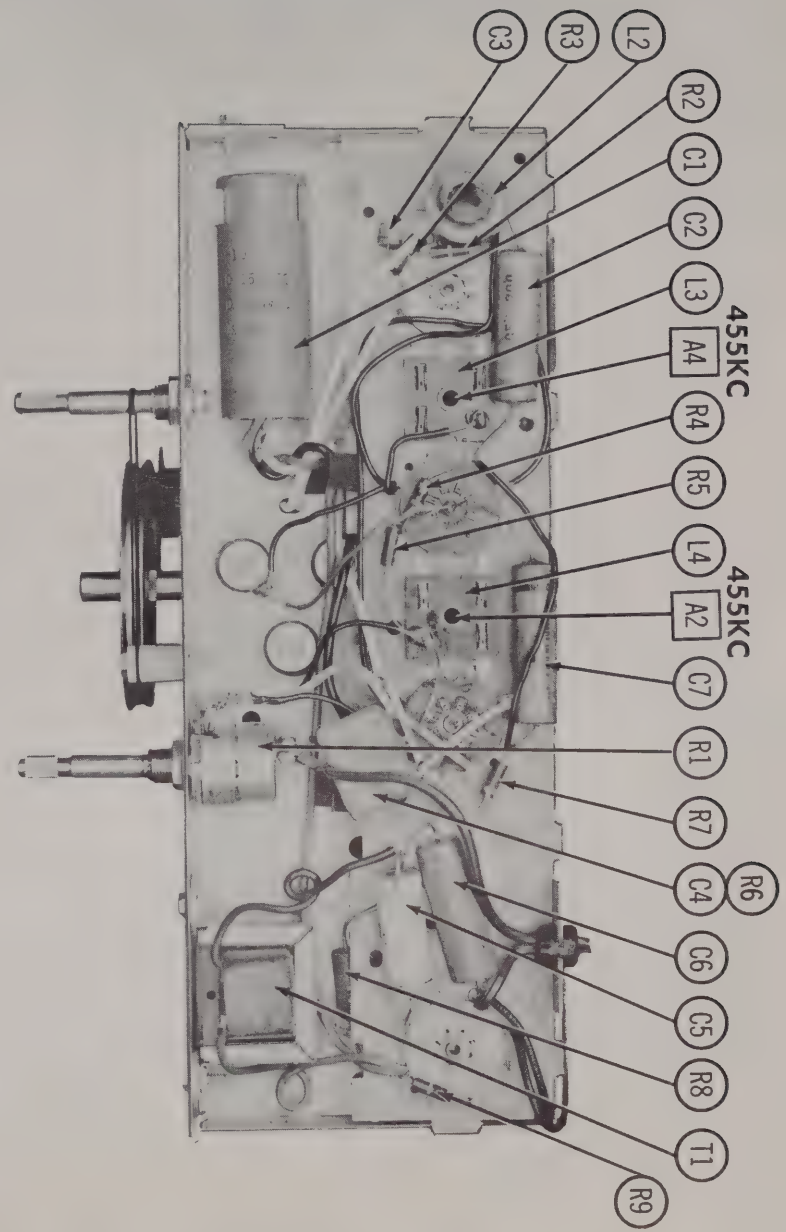
ITEM No.	PART NAME	G. E. PART No.	NOTES
M1	Dial Light		#44
M2	Tuning Cap.	RCT-076	2 Gang (17-315MMF, 23-150MMF)
	Cabinet	RAU-385	Model 465, Mahogany
	Cabinet	RAU-386	Model 466, Ivory
	Cabinet	RAU-437	Model 467, Gray
	Knob	RDK-425	On-Off-Volume, Tuning
	Dial Scale and Window	RDS-134	Models 465, 467
	Dial Scale and Window	RDS-135	Model 466
	Dial Pointer	RDP-082	



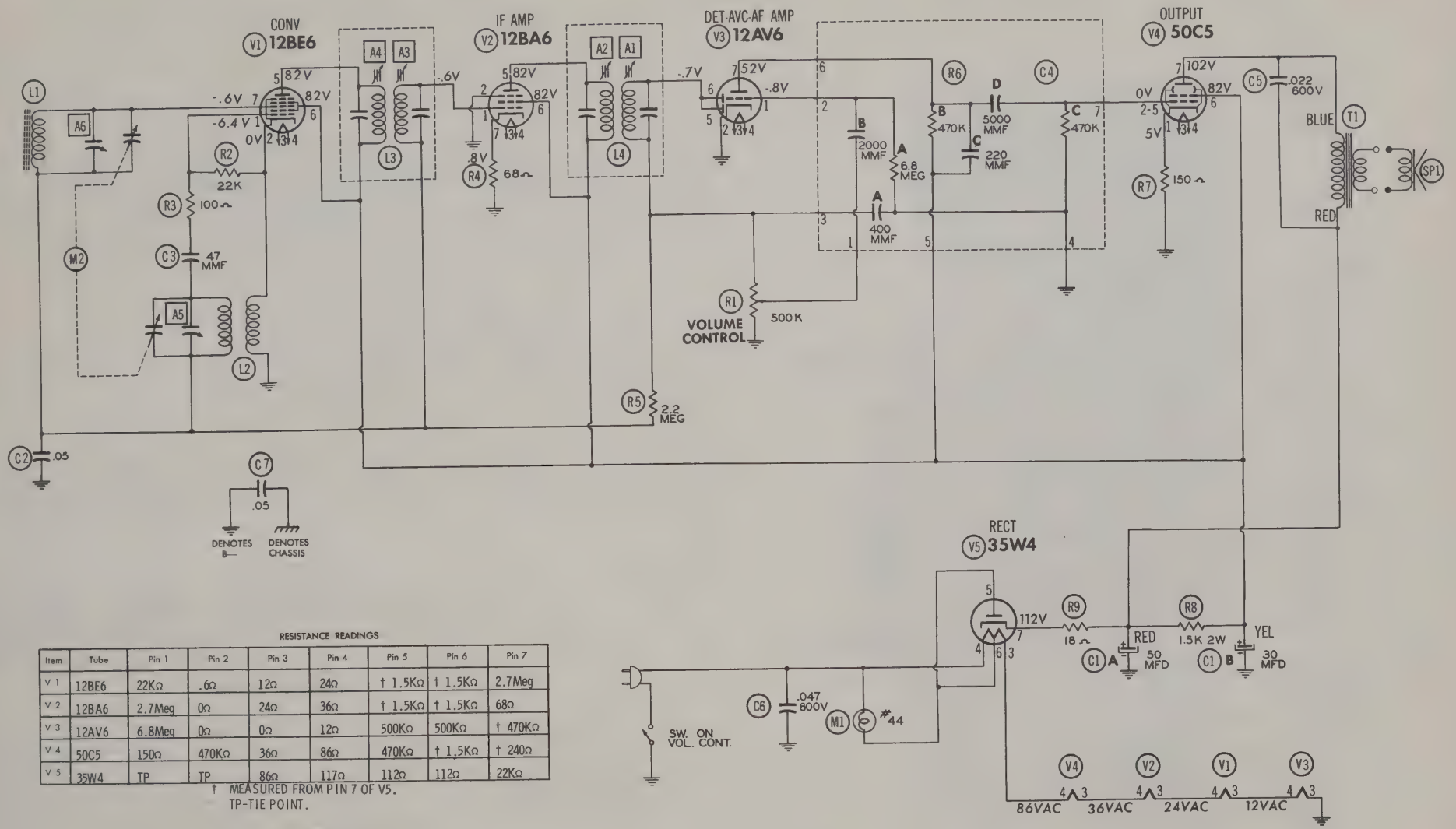
TUNING GANG FULLY CLOSED

DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



GENERAL ELECTRIC
Model 465



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.6Ω	12Ω	24Ω	† 1.5KΩ	† 1.5KΩ	2.7Meg
V 2	12BA6	2.7Meg	0Ω	24Ω	36Ω	† 1.5KΩ	† 1.5KΩ	68Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	500KΩ	500KΩ	† 470KΩ
V 4	50C5	150Ω	470KΩ	36Ω	86Ω	470KΩ	† 1.5KΩ	† 240Ω
V 5	35W4	TP	TP	86Ω	117Ω	112Ω	112Ω	22KΩ

† MEASURED FROM PIN 7 OF V5.
TP-TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

IF = 455KC

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A PHOTOFACT STANDARD NOTATION SCHEMATIC

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HALLICRAFTERS MODELS 21K200B, 21K201B, 21K210M, 21K211M, 21K220B, 21K221B, 21K230M, 21K231M (Ch. A1400D, B1400D)

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HALLICRAFTERS MODEL 21K211M

TRADE NAME	HALLICRAFTERS MODELS	CHASSIS
	21K201B, 21K211M, 21K221B, 21K231M	A1400D
	21K200B, 21K210M, 21K220B, 21K230M	B1400D
MANUFACTURER	The Hallicrafters Co., 4401 W. 5th Avenue, Chicago 24, Illinois	
TYPE SET	Television Receiver	
TUBES	Twenty-Six	
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.96 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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HALLICRAFTERS MODELS 21K200B, 21K201B, 21K210M, 21K211M, 21K220B, 21K221B, 21K230M, 21K231M (Ch. A1400D, B1400D)

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 push-on type control knobs from front panel of cabinet.
2. Remove 7 wood screws. Remove rear cover.
3. Remove 4 chassis bolts.
4. Remove picture tube socket, H. V. lead, yoke plug, speaker plugs and ground strap.
5. Remove chassis.
6. Remove 4 speaker nuts. Remove speaker.

PICTURE TUBE REMOVAL

1. Remove chassis as outlined above.
2. Lay cabinet face down on a soft surface.
3. Remove Ion trap.
4. Remove 4 hex nuts holding picture tube bracket assembly to cabinet.
5. Remove 1 wood screw from bracket at rear of cabinet.
6. Remove picture tube and assembly from cabinet.

MODELS	CHASSIS
21K201B, 21K211M, 21K221B, 21K231M	A1400D
21K200B, 21K210M, 21K220B, 21K230M	B1400D

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Remove 6 push-on type control knobs. Remove 4 wood screws holding knob escutcheon, insert a long thin screwdriver thru hole in the cabinet to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 6 push-on type control knobs and remove 4 wood screws holding knob escutcheon. Remove 3 wood screws holding metal molding at the top edge of the safety glass. Remove metal holding and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

SPECIAL ADJUSTMENTS

PICTURE GUARD CONTROL

In strong signal areas the picture guard control (R10) should be left in its maximum counter clockwise position. In weak signal areas turn R10 clockwise until stable sync is obtained.

AGC CONTROL ADJUSTMENTS

Tune in the strongest TV signal available, preferably a test pattern. Adjust the horizontal and vertical hold controls to their proper adjustments. Turn the brightness and contrast controls maximum clockwise. Turn the picture guard control (R10) and the AGC control (R9) maximum counter clockwise. Adjust the AGC control clockwise until picture on screen appears dark, slightly unstable sync. Then turn R9 counter clockwise approximately 1/8 turn for stable sync. Switch off channel and back again. Picture should lock-in with both vertical and horizontal sync being stable. If necessary turn R9 farther counter clockwise.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to to remove the rear cover and supply power to the set. Set the horizontal hold control at the center of its range and adjust the horizontal oscillator slug of L45 until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the radio detector secondary of L42 located on top of chassis.

FUSES

Two fuses are used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

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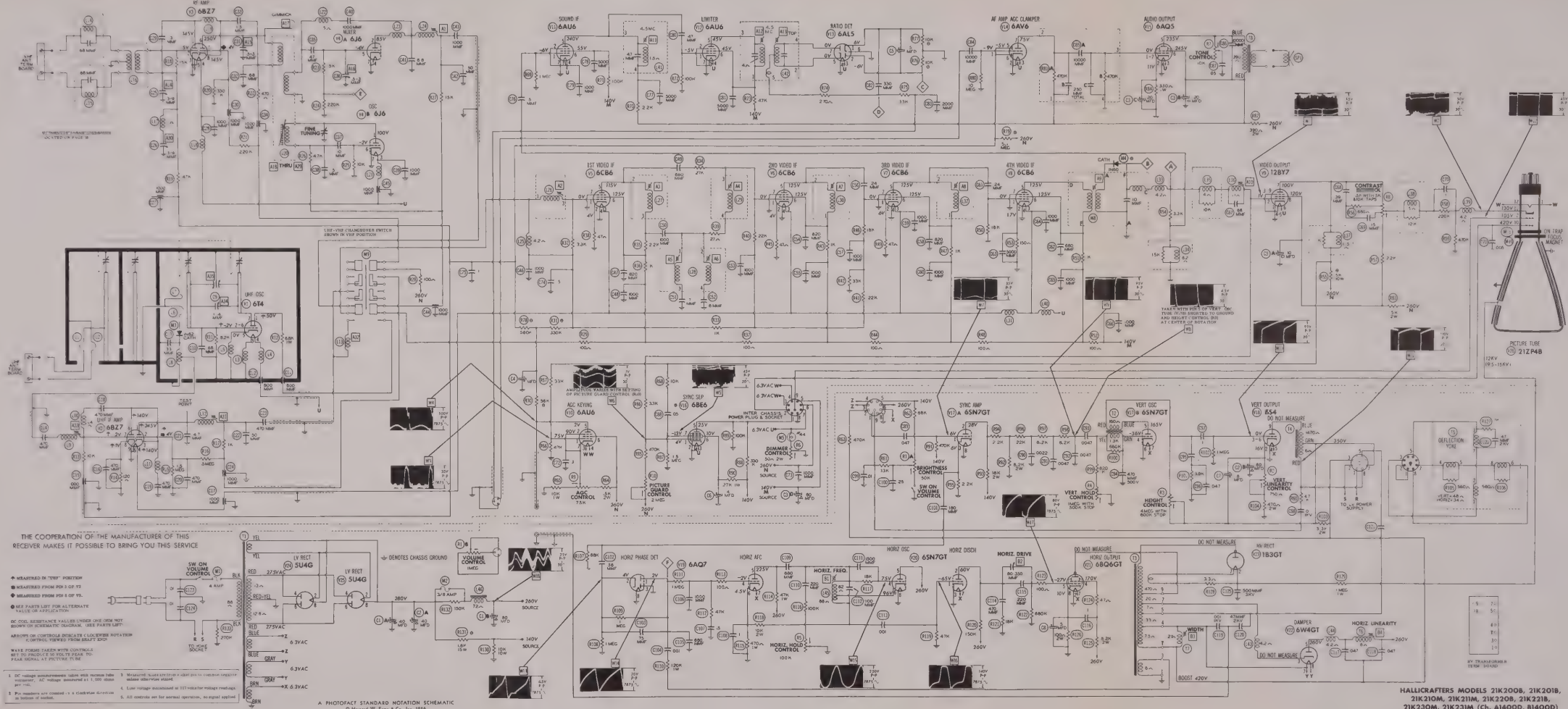
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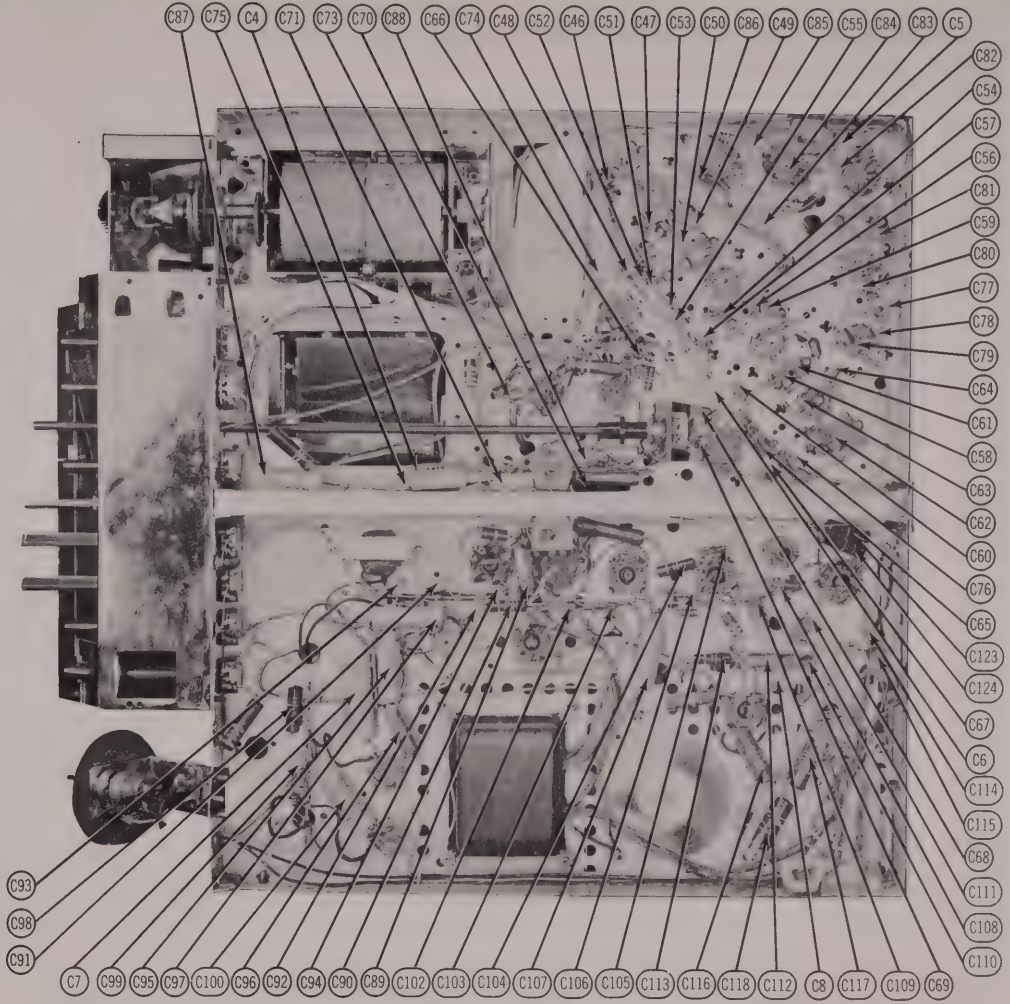
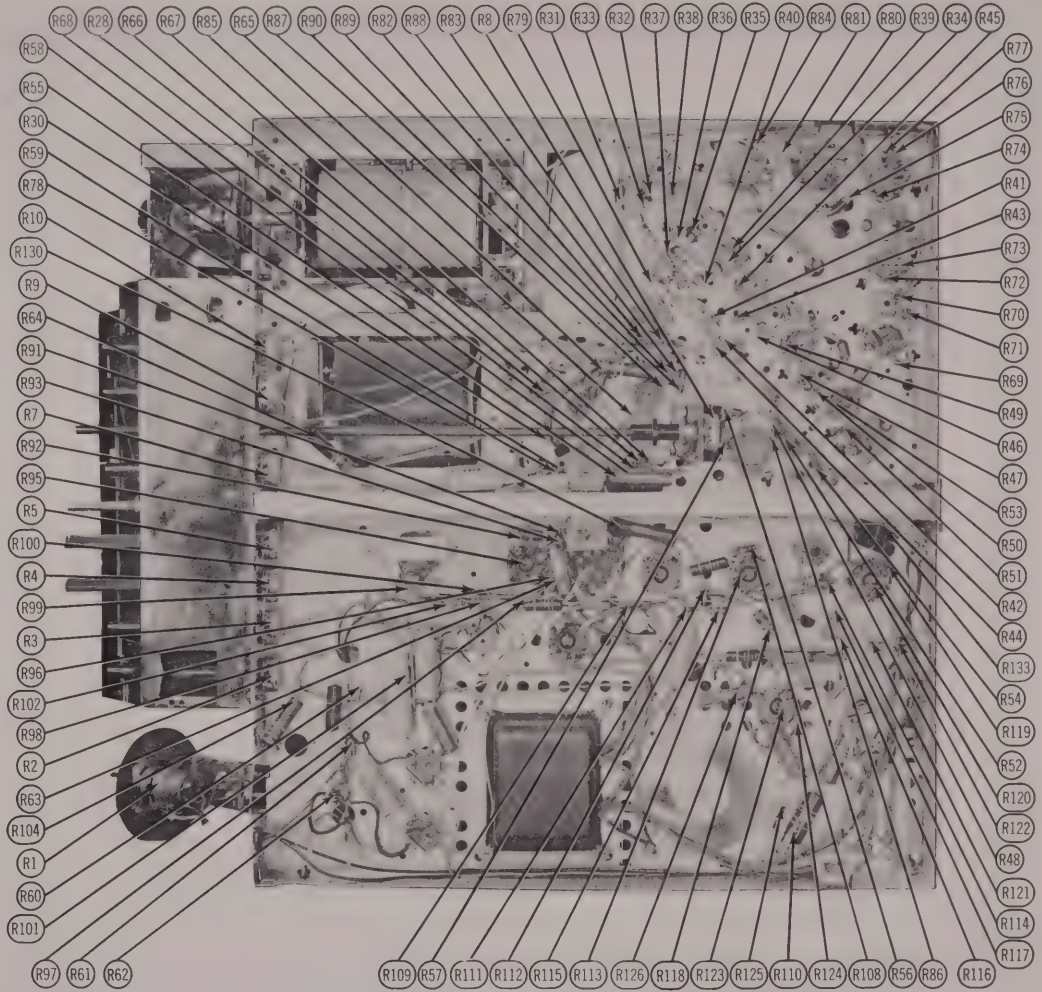


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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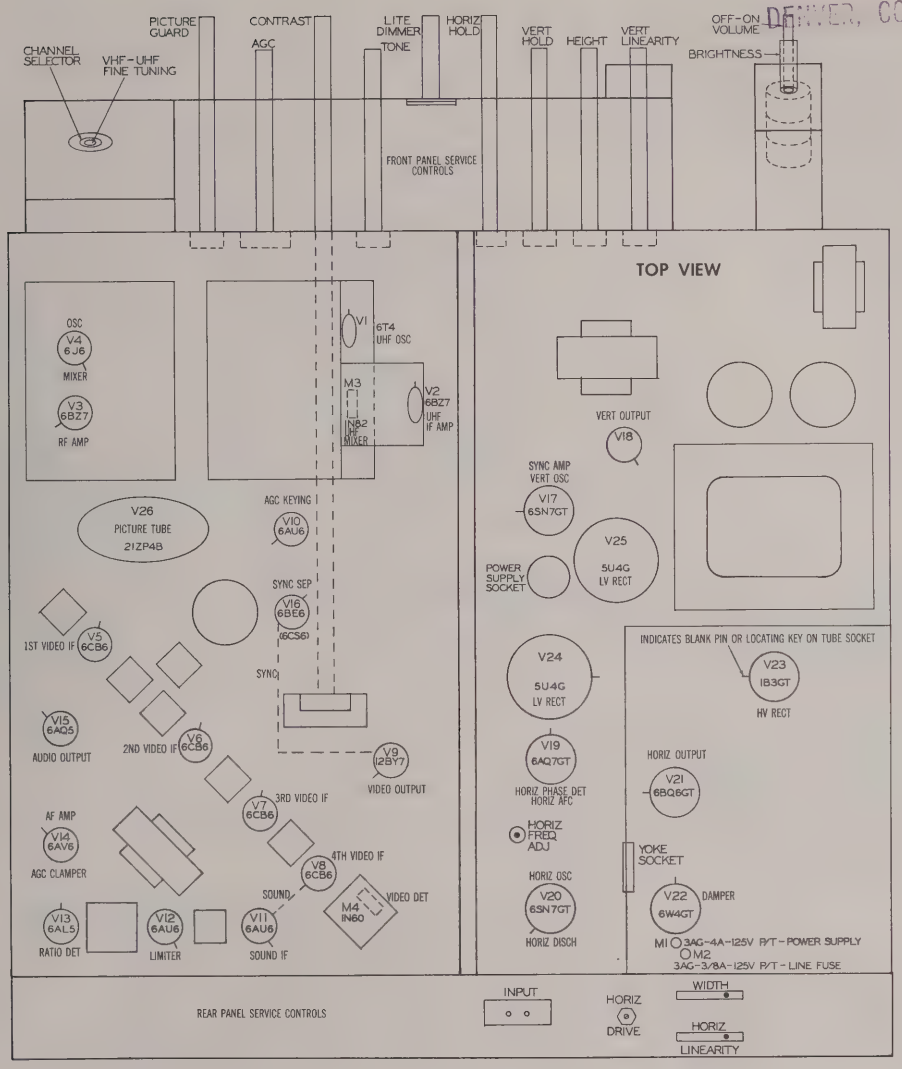
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V24, V25, Fuses (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V4, V5, V6, V7, V8, (V1 UHF only)**
No pic, no sound, has snow - **V3, V4, V5**
No pic, has sound, has raster - **V9, V10, V26**
Has pic, no sound - **V11, V12, V13, V14, V15**
Overloaded picture - **V10 , V14**

SYNC FAILURE
No vert. sync - **V17**
No horiz. sync - **V17, V19, V20**
No vert. or horiz. sync - **V16, V17**

SWEEP FAILURE
No raster, has sound - **V20, V21, V22, V23, V26**
No vertical deflection - **V17, V18**
Poor vert. linearity or foldover - **V17, V18**
Poor horiz. linearity or foldover - **V20, V21, V22**
Narrow picture - **V20, V21, V22, V23, V24, V25**
Vert. off freq. - **V17**
Horiz. off freq. - **V17, V19, V20**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube V30.

VIDEO IF ALIGNMENT

Remove the converter tube (V4) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications. In step 3 connect the negative lead of a 3 volt bias supply thru 1KΩ to the ungrounded side of C74. Connect the positive lead to chassis.
Use only enough sweep generator output for useable pattern on scope. If sweep generator has no built-in marker, couple a marker generator loosely to sweep generator output.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V4). Low side to chassis.	44MC (10MC Swp)	41.75MC 45.75MC	Any	Vert. Amp. thru detector (Fig. 1) to pin 5 Plate of 6CB6 (V5). Low side to chassis.	A1, A2	Connect a clip lead across terminals 1 and 2 of L28A and terminals 2 and 4 of L15B. Connect a .001MFD capacitor from pin 1 (grid) of 6CB6 (V7) to chassis. Adjust A1 and A2 for response curve similar to Fig. 2. Remove short from L28A and L28B.
2.	.001MFD	High side thru .001MFD capacitor to pin 1 (grid) of 6CB6 (V5). Low side to chassis	"	41.25MC 45.0MC 47.25MC	"	Vert. Amp. thru detector (Fig. 1) to pin 5 (plate) of 6CB6 (V6). Low side to chassis.	A3, A4, A5, A6	Connect a clip lead from terminal #1 of L28 to chassis. Leave .001MFD capacitor from pin 1 of V5 to chassis connected as in step 1. Adjust A3 and A4 for response similar to Fig. 3. Adjust A5 (41.25MC) and A6 (47.25MC) to place markers in sound traps as in Fig. 3. If necessary, retouch A3 and A4 after adjusting trap positions. Remove clip lead from terminal #1 of L28. Remove .001MFD capacitor from pin 1 of V7 to chassis.
3.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V4). Low side to chassis.	"	41.25MC 45.75MC 47.25MC	"	Vert. Amp. thru 3.3KΩ to point (A). Low side to chassis.	A7, A8, A9	Adjust for -3 volts bias at ungrounded side of C74. Adjust A7, A8 and A9 for response similar to Fig. 4. A7 affects the high frequency side of response curve. A8 affects the low frequency side. A9 affects overall tilt of top portion of response curve. Do not retouch adjustments A1 thru A6. If necessary, repeat steps 1, 2 and 3 until desired response is obtained. Replace original 6J6 in its socket.

4.5MC TRAP ALIGNMENT

Disconnect one side of 1N64 crystal at point (D). Do not overheat crystal with soldering iron. Set contrast control at maximum position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	3.3KΩ ½Watt Carbon Resistor	High side thru 3.3KΩ to point (D). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig. 1) to pin 1 (cathode) of picture tube. Common to chassis.	A10	Use high signal generator output. Turn A10 fully counter clockwise, then clockwise for MINIMUM deflection on VTVM. Reconnect 1N64 crystal at point (D).

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Disconnect one side of 1N64 crystal at point (D).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	3.3KΩ ½Watt Carbon Resistor	High side thru 3.3KΩ to point (D). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (C). Common to chassis.	A11, A12	Adjust for MAXIMUM deflection.
6.	"	"	"	"	DC probe to point (B). Common to chassis.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Reconnect 1N64 crystal at point (D).

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Disconnect one side of 1N64 crystal at point (D).
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	3.3KΩ ½ watt carbon Resistor	High side thru 3.3KΩ to point (D). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (C). Low side to chassis.	A11, A12	Disconnect stabilizing capacitor C5. Adjust for curve of maximum amplitude and symmetry as in Fig. 8.
6.	"	"	"	"	"	Vert. Amp. to point (B). Low side in chassis.	A13	Reconnect stabilizing capacitor C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 6. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines. Reconnect 1N64 crysta at point (D).

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C75 thru a 1KΩ resistor. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A14, A15, A16, A17	Adjust for response curve similar to Fig. 7. If unable to obtain the correct bandwidth by adjusting A14, A15 and A16 SLIGHTLY adjust A17 (wire gimmick). To increase bandwidth adjust A17 away from contacts. To decrease bandwidth adjust A17 closer to contacts
8.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 7. If markers fall below 70% on any channel make compromise adjustments of A14, A15 and A16 with channel switch set to that channel. Then recheck all other channels to see that they have not been seriously affected. Do not readjust A17 on any channel except channel 10.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			83MC (10MC Swp)	81.25MC 85.75MC	6			
			77MC (10MC Swp)	75.25MC 79.75MC	5			
			65MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			51MC (10MC Swp)	55.25MC 59.75MC	2			

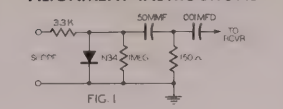


FIG. 1

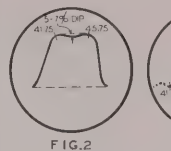


FIG.2

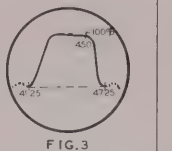


FIG.3

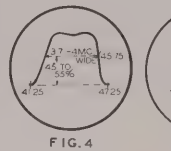


FIG.4

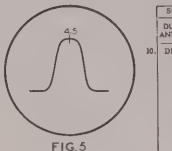


FIG.5

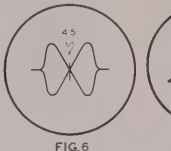


FIG.6

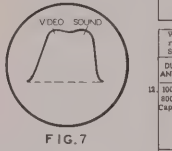


FIG.7

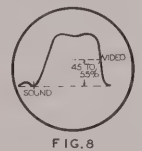


FIG.8

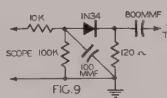


FIG.9

VHF OSCILLATOR ALIGNMENT

Leave bias connected as under "VHF RF and Mixer Alignment". Connect a jumper from the ungrounded side of C75 to the ungrounded side of C74.
The channel oscillator adjustment screws are reached through a hold just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 3.3KΩ to point (A). Low side to chassis.	A18	Advance scope gain so that the sound trap notch is visible on response curve. Adjust to place sound marker in trap notch. Video marker should fall at 45 to 55% response on opposite slope of response curve as in Fig. 8.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A19	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A20	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A21	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A22	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A23	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A24	
			83MC (10MC Swp)	83.25MC 87.75MC	6		A25	
			77MC (10MC Swp)	77.25MC 81.75MC	5		A26	
			69MC (10MC Swp)	69.25MC 73.75MC	4		A27	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A28	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A29	

IF TRAP ALIGNMENT

The IF trap, A30, is for the purpose of eliminating any IF interference from nearby transmitters operating in the 40 to 54MC band. If interference is noted, turn to channel 2 and adjust A30 to minimize it.

UHF IF STAGE ALIGNMENT

Switch channel selector to UHF position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Direct	High side to pin 7 (grid) of UHF IF amplifier tube (6BZ7). Low side to chassis. Remove the side shield on tuner to connect sweep generator).	44MC (10MC Swp)	41.75MC 45.75MC	Any unused channel between 35 and 65	Vert. Amp. thru detector (Fig. 1) to pin 5 (plate) of 6CB6 (V5). Low side to chassis.	A31, A32	Loosely couple marker generator to sweep generator output. Adjust A31 for response curve similar to Fig. 2. Check position of 41.75MC and 45.75MC markers. If markers do not fall on peaks of curve as in Fig. 2, adjust A32 (compress or expand coil turns) for correct marker positions. Compressing coil turns lowers the frequencies. Expanding turns increase frequency of the peaks. If A32 requires adjusting readjust A31 for equal peaks with correct marker positions.
11.	Two 120Ω Carbon Resistors	Across UHF antenna terminals with 120Ω in each lead.	629MC (10MC Swp)	41.75MC 45.75MC	40	Vert. Amp. thru detector (Fig. 1) to point (E). Low side to tuner chassis.	A33	Loosely couple marker generator to sweep generator output. Adjust A33 for maximum amplitude with equal peaks as in Fig. 2. Markers should appear on peaks of response curve.

UHF OSCILLATOR ALIGNMENT

When replacing the UHF oscillator tube (6T4) it may be necessary to try several tubes for one which gives the best performance. This portion of the receiver has been properly aligned at the factory. If it becomes necessary, proceed as follows:
Switch channel selector to UHF position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	100 to 800MMF Capacitor	High side of UHF signal generator to diode crystal clip osc. section in the UHF tuner. Low side to chassis.	Not used	945MC (400%Mod)	UHF tuning shaft max. clockwise (high freq. end)	Vert. Amp. thru detector (Fig. 1) to point (E). Low side to tuner chassis.	A34	Use low generator output. Adjust for MINIMUM 400% indication on scope.
13.	"	"	"	504MC (400%Mod)	UHF tuning shaft max. counter clockwise (low freq. end)	"	A35	Use low generator output. Adjust for MINIMUM 400% indication on scope. Repeat steps 12 and 13. If necessary replace oscillator tube (6T4) and repeat steps 12 and 13.

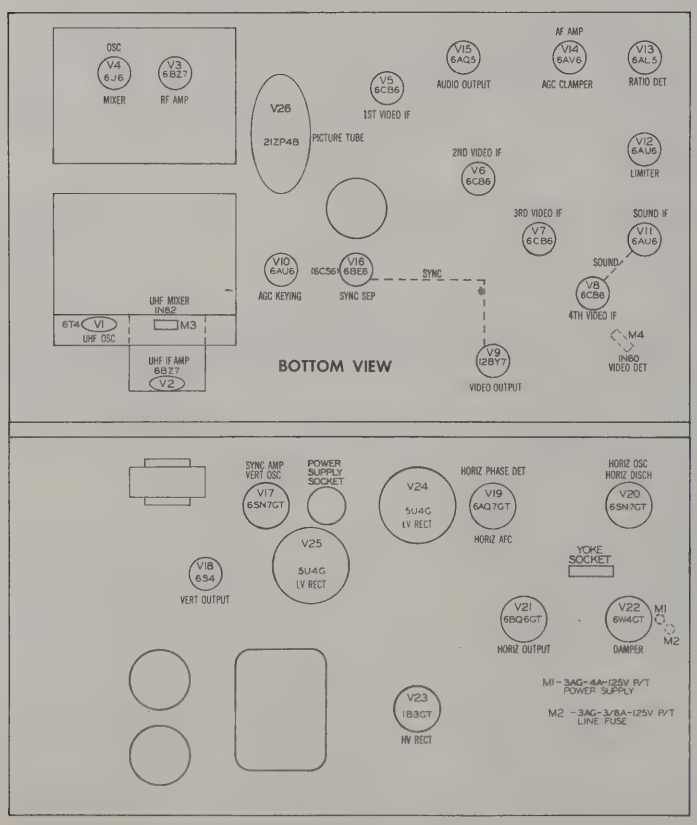
UHF RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

RESISTANCE MEASUREMENTS

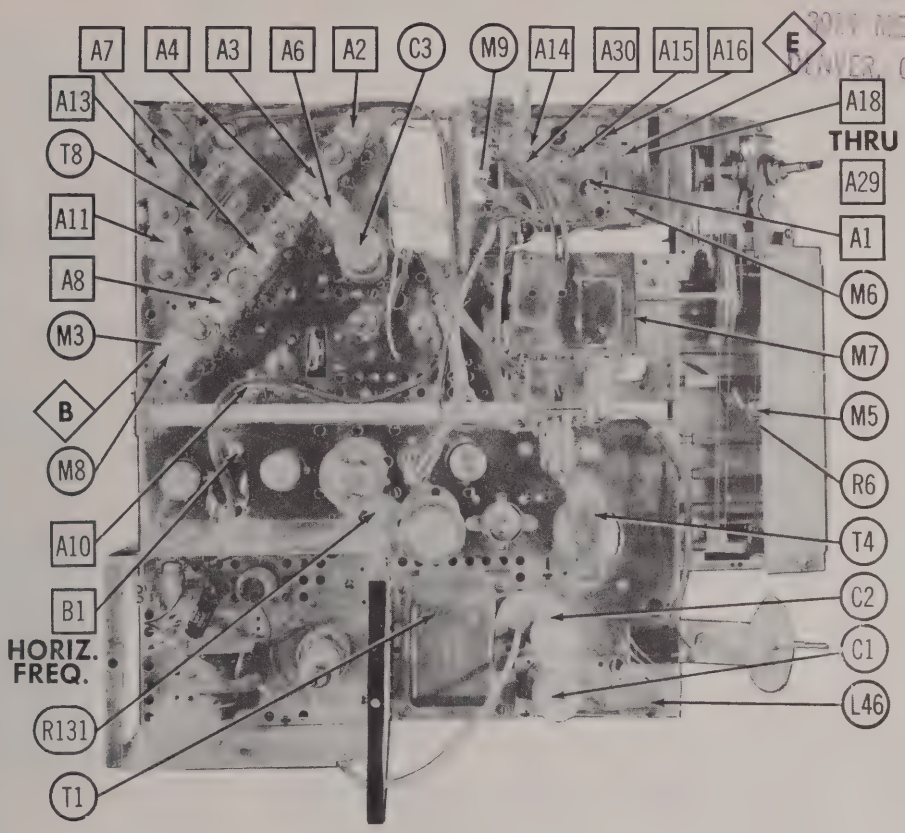
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6T4	*† 9KΩ	8.2KΩ	0Ω	.1Ω	0Ω	8.2KΩ	*† 9KΩ		
V 2	6BZ7	*† 1.1KΩ	* 700KΩ	INF	.1Ω	0Ω	INF	850KΩ	120Ω	0Ω
V 3	6BZ7	INF	850KΩ	0Ω	.1Ω	0Ω	† 625Ω	140KΩ	INF	0Ω
V 4	6J6	† 7KΩ	† 17KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 5	6CB6	60KΩ	47Ω	.1Ω	0Ω	† 5KΩ	† 3KΩ	0Ω		
V 6	6CB6	80KΩ	47Ω	.1Ω	0Ω	† 3KΩ	† 3KΩ	0Ω		
V 7	6CB6	50KΩ	47Ω	.1Ω	0Ω	† 3KΩ	† 3KΩ	0Ω		
V 8	6CB6	18KΩ	150Ω	.1Ω	0Ω	† 2.7KΩ	† 2.7KΩ	0Ω		
V 9	12BY7	0Ω	3.3KΩ	0Ω	0Ω	0Ω	.1Ω	† 4.4KΩ	† 9KΩ	0Ω
V 10	6AU6	† 25KΩ	† 10KΩ	INF	INF	440KΩ	† 75Ω	† 10KΩ		
V 11	6AU6	1Meg	0Ω	0Ω	.1Ω	† 2.6KΩ	† 100KΩ	0Ω		
V 12	6AU6	100KΩ	0Ω	0Ω	.1Ω	† 47KΩ	† 47KΩ	0Ω		
V 13	6AL5	10KΩ	10KΩ	.1Ω	0Ω	1Meg	0Ω	1Meg		
V 14	6AV6	10Meg	0Ω	.1Ω	0Ω	850KΩ	850KΩ	† 500KΩ		
V 15	6AQ5	470KΩ	330Ω	.1Ω	0Ω	† 850Ω	† 500Ω	470KΩ		
V 16	6BE6	40KΩ	0Ω	.1Ω	0Ω	† 90KΩ	† 30KΩ	1.5Meg		
V 17	6SN7GT	† 500KΩ	† 9KΩ	2.2KΩ	1Meg	▲ 1.5Meg	0Ω	.1Ω	0Ω	
V 18	6S4	NC	1KΩ	1Meg	0Ω	.1Ω	1Meg	NC	NC	▲ 4.8KΩ
V 19	6AQ7	2Meg	1Meg	0Ω	3Meg	† 47KΩ	470Ω	.1Ω	0Ω	
V 20	6SN7GT	47KΩ	† 150KΩ	0Ω	32KΩ	† 75Ω	10KΩ	.1Ω	0Ω	
V 21	6BQ6GT	TP	0Ω	TP	† 8.2KΩ	680KΩ	TP	.1Ω	100Ω	TOP CAP ▲ 24Ω
V 22	6W4GT	NC	NC	350KΩ	NC	† 90Ω	NC	350KΩ	350KΩ	
V 23	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 494Ω
V 24	5U4G	NC	5KΩ	NC	13Ω	NC	13Ω	TP	5KΩ	
V 25	5U4G	NC	5KΩ	NC	13Ω	NC	13Ω	NC	5KΩ	
V 26	21ZP4B	INF	† 100KΩ	PIN 10 ▲ 470KΩ	PIN 11 † 160KΩ	PIN 12 INF				

* MEASURED IN "UHF" POSITION.
† MEASURED FROM PIN 8 OF V25.
▲ MEASURED FROM PIN 3 OF V22.
TP-TIE POINT.
NC-NO CONNECTION.

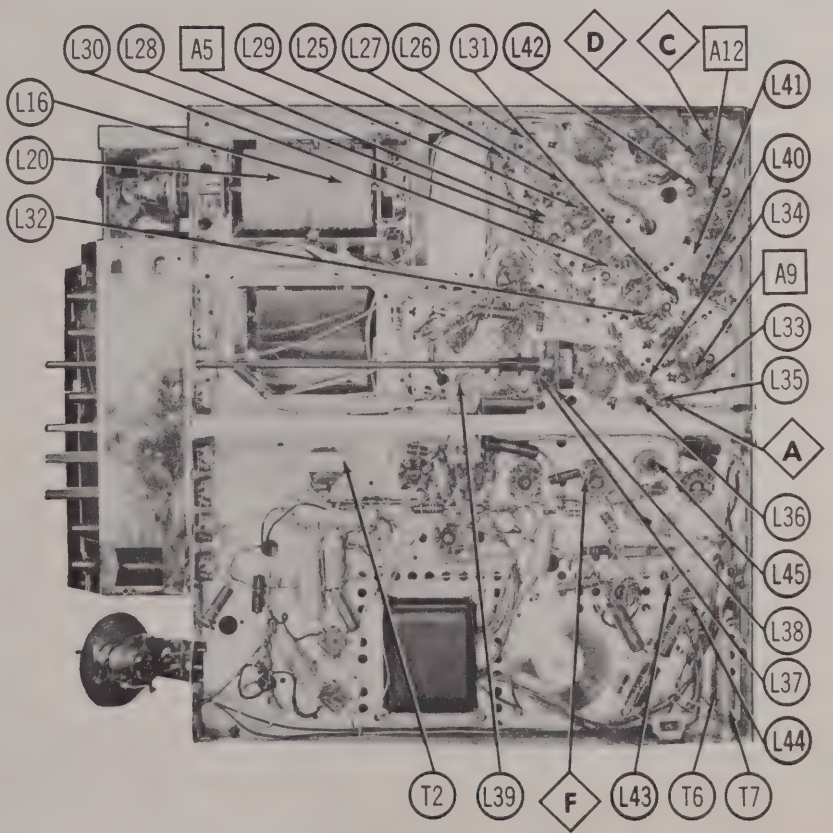


TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
2044 MEADE ST.
DENVER, COLORADO



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

COMPARISON OF 1400D SERIES CHASSIS

The 1400D, Run 1 chassis may be considered the basic chassis in the 1400D Series, Run numbers shown below will indicate variations from this standard by one or more modifications.

CHASSIS	PICTURE TUBE SIZE	VHF TUNER TYPE	UHF TUNER TYPE	RUN	MODIFICATIONS
A1400D	21" Glass	1E1734	1E1855	1	I, II, II, IV
				2	I, II, III, IV, V and in some chassis VII
				3	I, II, III, IV, V, VII, VIII
				3-1	I, II, III, IV, V, VII, IX, X, XI, XII, XIII
B1400D	21" Glass	1E1733	None	1	Basic 21" VHF Chassis IV
				2	IV, V and in some chassis VII
				3	IV, V, VII, VIII
				3-1	IV, V, VII, IX, X, XI, XII, XIII

MODIFICATION I

LOCATION OF CHANGE	CHANGE MADE
A. Tuner	A. Tuner changed to part #1E1734.

MODIFICATION II

LOCATION OF CHANGE	CHANGE MADE
A. Tuner	A. UHF-VHF change-over switch added.

MODIFICATION III

LOCATION OF CHANGE	CHANGE MADE
A. Tuner	A. A continuous type UHF tuner (part #1E1855) added.

MODIFICATION IV

LOCATION OF CHANGE	CHANGE MADE
A. Audio output screen (pin 6 of V15). B. Audio output cathode (pin 2 of V15). C. Audio output screen (pin 6 of V15). D. Audio output plate (pin 5 of V15). E. Pins 5 and 6 of V14. F. Pins 5 and 6 of V14.	A. The value of C3C is increased from 20MFD to 60MFD by adding a 40MFD, 450V electrolytic in parallel with C3C. B. R84 is increased from 270Ω to 330Ω. C. R82 is increased from 390Ω to 560Ω. D. C86 is changed from .01MFD, 500V. ceramic disc to a .01MFD, 1000V molded tubular. E. C75 is increased from .1MFD, 200V to.5MFD, 25V. F. R79 which connected to pin 6 of V15 is now connected to the junction of R82 and R83.

MODIFICATION V

LOCATION OF CHANGE	CHANGE MADE
A. Horizontal AFC and oscillator.	A. V19 and V20 are shock mounted.

MODIFICATION VI

LOCATION OF CHANGE	CHANGE MADE
A. In series with height control (R3).	A. A 1Meg, 1 watt resistor is added in series with the high side of R3 and the junction of C95 and C97.

MODIFICATION VII

LOCATION OF CHANGE	CHANGE MADE
A. High side of vertical hold control (R4).	A. A 220KΩ resistor added from the high side of R4 to the junction of C93 and the yellow lead of the vertical oscillator transformer (T2).

CONTINUED ON PAGE 17

PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	UHF Oscillator	6T4	
V2	UHF IF Amplifier	6BZ7	
V3	RF Amplifier	6BZ7	
V4	Mixer-Oscillator	6J6	
V5	1st. Video IF Amplifier	6CB6	
V6	2nd. Video IF Amplifier	6CB6	
V7	3rd. Video IF Amplifier	6CB6	
V8	4th. Video IF Amplifier	6CB6	
V9	Video Output	12BY7	
V10	AGC Keying	6AU6	
V11	Sound IF Amplifier	6AU6	
V12	Limiter	6AU6	
V13	Ratio Detector	6AL5	
V14	AF Amplifier-AGC Clamper	6AV6	
V15	Audio Output	6AQ5	
V16	Sync Separator	6BE6	Note 1
V17	Sync Amplifier-Vert. Oscillator	6SN7GT	
V18	Vert. Output	6S4	
V19	Horiz. Phase Detector-Horiz. AFC	6AQ7	
V20	Horiz. Oscillator-Horiz. Discharge	6SN7GT	
V21	Horiz. Output	6BQ6GT	
V22	Damper	6W4GT	
V23	HV Rectifier	1B3GT	
V24	LV Rectifier	5U4G	
V25	LV Rectifier	5U4G	

Note 1. 6CS6 may be used in some versions.

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	Hallicrafters PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V26	21ZP4B ①	21ZP4B ① 21ZP4A	21ZP4B ① 21ZP4A	21ZP4B ② 21ZP4A 21ZP4	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Hallicrafters PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	400	45C236	AFH2-64	B048	FP229.4	TM-8040-450	D-255	TVL-2675
B	▲80	400							
C2A	▲40	400	45C239	AFH2-86-60	C159	FP250	TM-4021	T-535	TVL-2653
B	▲80	50							
C3A	■10	350	45C238	E4D667	C167	FP333.8		Q-380	R2218 *
B	▲20	400			BR202	TC26		MT-4520	
C	20	25							
D	▲80	300							
C4	1	50	45C163	SRE50V1	BBR1-50	TC31	TD-1-50	MMT-0502	TVA-1300
C5	5	50	45B175	SRE50V5	BBR550	TC30	TD-5-50	MMT-0505	TVA-1303
C6	4	300	45B241	PRS350V4	BR435	TC60	TD-8-350	FM-4504	TVA-1601
C7	8	475	45A103	PRS500V8	BR850	TC81	TD-8-475	MT-4710	TVA-1802
C8	5	50	45B175	SRE50V5	BBR550	TC30	TD-5-50	MMT-0505	TVA-1303

* Unit must be ordered from Mfgr.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C9	1-4									
C10	.68				TCZ-R68					
C11	800			EF-001	MFT-1000				503C-D1	
C12	800			EF-001	MFT-1000				503C-D1	
C13	33			NP0-DI33	TCZ-33	Z029	NP0L-330	ZT-5433	5TCC-Q33	
C14	470		47C20A471N	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C15	1000		47B402	EF-001	MFT-1000				503C-D1	
C16	470		47C20A471N	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C17	1000		47B402	EF-001	MFT-1000				503C-D1	
C18	470		47C20A471N	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C19	470		47C20A471N	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C20	470		47C20A471N	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C21	4.7			NP0-SI4.7	TCZ-4R7	TZ07	NP0A-050	ZT-555	5TCCB-V47	
C22	50		47CA20A470J	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C23	470		47CA25A471	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C24	1000		47B402	EF-001	MFT-1000				503C-D1	
C25	3-9				829-10					
C26	3-9				829-10					
C27	1000			EF-001	MFT-1000				503C-D1	
C28	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C29	3			NP0-DI3	TCZ-3R3	Z007	NP0A-030	ZT-553	5TCCB-V33	
C30	1000			EF-001	MFT-1000				503C-D1	
C31	.5-3				829-3		3115-01-0R5	CT565A		
C32	68			BPD-000068	DD-680	G038	811-680	UC-5468	5GA-Q68	
C33	1.5			NP0-SI1.5	TCZ-1R5	Z004	NP0A-1R5	ZT-5515	5TCCB-V15	
C34	1000			EF-001	MFT-1000				503C-D1	
C35	47			BPD-000047	DD-470	G033	831-470	UC-5447	5GA-Q47	
C36	.5-3				829-3		3115-01-0R5	CT565A		
C37	10			NP0-DI10	TCZ-10	Z018	NP0A-100	ZT-541	5TCC-Q1	
C38	5			N750-SI5	TCZ-5	N011	N750A-050		5TCUB-V5	
C39	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C40	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C41	6.8			NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C42	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C43	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C44	1000			EF-001	MFT-1000				503C-D1	
C45	1000			EF-001	MFT-1000				503C-D1	
C46	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C47	820		47A320	SI820	D6-821	K067	GP2L-821		5GA-T82	
C48	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C49	680		47A319	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C50	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C51	7		47X20UJ070C/D							
C52	6		47X20UJ060C/D							
C53	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C54	820		47A320	SI820	D6-821	K067	GP2L-821		5GA-T82	
C55	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C56	24		47CA20A240J	SI24	D6-250	G025	GP1K-240	UC-5425	5GA-Q25	
C57	1000		47A230	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C58	820		47A320	SI820	D6-821	K067	GP2L-821		5GA-T82	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C89	1000		47A230	BPD-001	DD-102	ED69	501-001	DC-521	5HK-D1	
C90	1000		47A230	BPD-001	DD-102	ED69	501-001	DC-521	5HX-D1	
C91	34		47CA30A340J	B124	DE-350	CG35	GPJK-340	UC-5425	5GA-Q25	
C92	680		47A310	B1690	DE-681	TP90	GPJK-681	UC-5368	5GA-T68	
C93	5000		47A168	BPD-005	DD-502	KD82	811-005	DC-525	5HK-D5	
C94	1000		47A230	BPD-001	DD-102	ED69	501-001	DC-521	5HK-D1	
C95	1000		47A230	BPD-001	DD-102	ED69	501-001	DC-521	5HK-D1	
C96	1000		47A230	BPD-001	DD-102	ED69	501-001	DC-521	5HK-D1	
C97	66		47X30T1T660K							
C98	39		47CA39A390K	B139	DE-390	TP39	GPJK-390	UC-5439	5GA-Q39	
C99	18		47CA39A180K	B118	DE-180	TP18	GPJK-180	UC-5418	5GA-Q18	
C70	.1	600	68BS104L4	P488N-1	DF-104	CU34P1		PT401	4TM-P1	
C71	.005	600	68A Y503J	B15600	DF-502	CU38D5	GP3-333-502	PT625	6TM-D5	
C72	.1	400	68AY104J	P488N-1	DF-104	CU34P1		PT401	4TM-P1	
C73	1000		47A330	BPD-001	DD-103	KD69	501-001	DC-531	5HK-D1	
C74	.15	200		CU15AP15		CU15P15		PT615	5TM-P15	
C75	.1	200	68AU104J	P288N-1	DF-104	CU34P1		PT401	3TM-P1	
C76	5		47A160-5	B15	DE-050	TP05	GPJK-050	ET-555	5GA-V5	
C77	5000		47A168	BPD-005	DD-502	KD80	811-005	DC-525	5HK-D5	
C78	5000		47A168	BPD-005	DD-502	KD80	811-005	DC-525	5HK-D5	
C79	1000		47A330	BPD-001	DD-103	KD69	501-001	DC-531	5HK-D1	
C80	47		47CA24A470K	B147	DE-470	TP29	GPJK-470	UC-5447	5GA-Q47	
C81	5000		47A168	BPD-005	DD-502	KD80	811-005	DC-525	5HK-D5	
C82	330		47CA35A331K	B1330	DE-330	TP33	GPJK-331	UC-5333	5GA-T33	
C83	3000		47A395	BPD-003	DD-303	KT72	801-003	DC-523	5HK-D3	
C84	10000		47A334	BPD-01	DD-103	KD82	811-01	DC-511	5HK-B1	
C85A	10000									
B	250		#48A017	#PA-113-3	#PC-80	#115TM1	#1404-01		#T-1	
C										
C86	10000		47A334	BPD-01	DD-103	KD82	811-01	DC-511	5HK-B1	
C87	.05	600	68AY505J	BPD-05	DF-503	CU38D5		PT615	5TM-S5	
C88	.05	400	68AW503J	BPD-05	DF-503	CU38D5		PT615	4TM-S5	
C89	.047	400	68JS4731J	BPD-05	DF-503	CU38D47		PT1417	4TM-S47	
C90	.0022	400	68BS2221J	S12300	DE-223	CU38D22	GP3-333-223	PT2322	5TM-D22	
C91	.0047	400	68BS4731J	S14700	DE-472	CU38D47	GP3-333-472	PT2347	5TM-D47	
C92	.0047	400	68JS4731J	S14700	DE-472	CU38D47	GP3-333-472	PT2347	5TM-D47	
C93	.0047	400	68JS4731J	S14700	DE-472	CU38D47	GP3-333-472	PT2347	5TM-D47	
C94	470	500	47X308471K	S1470	DE-471	SW574T	GPJK-471	MC345	1FM-347	
C95	.1	600	68BS104L4	P488N-1	DF-104	CU34P1		PT401	4TM-P1	
C96	.047	400	68JS473L4	BPD-05	DF-503	CU38D47		PT1417	4TM-S47	
C97	.1	400	68AY104J	P488N-1	DF-104	CU34P1		PT401	4TM-P1	
C98	.01	1000	68AU103J	P1688N-01		CU38B1		PT761	1GTM-01	
C99	.01	600	68AT103J	BPD-01	DD-103	CU38B1	GP3-333-103	PT411	4TM-S1	
C100	.25	600	68AW254J	P488N-25		CU38P25		PT6025	6TM-P25	
C101	180	500	47X301B181K	1469-00018	DE-181	SR5T18	831-181	MC3437	MS-318	
C102	56	500	47X30D560K	1469-00056	DE-560	SR5G75	831-560		MS-456	
C103	75	500	47X30D750K	1469-00075	DE-750	SR5G75	831-750	MCE830	MS-475	
C104	.001	600	68BS102L6	S1000	DE-102	CU38D1	GP3L-102	PT931	6TM-D1	
C105	680	500		1464-00068		IR5T68	811-681		MS-368	
C106	1000	500	47X30B102K	S1000	DE-103	IW5D1	GP3L-102	MC355	1FM-31	
C107	.15	200	68A T154J	P288N-15		CU15P15		PT6015	3TM-P15	
C108	.1	500	68A T104J	P288N-1	DF-104	CU15P1		PT401	3TM-P1	
C109	680	500	47X308681K	1464-00068	DE-681	SR5T68	811-681		MS-368	
C110	220	500	47X30D221K	1469-00022	DE-221	SR5T22	831-221	MCE240	MS-322	
C111	1500	500	47X30B152K	1464-00015		IR5T15	811-153	MCE358	MS-215	
C113	1100	500	47X30D122K	1464-0011		IR5D11			MS-311	
C113	.001	600	68BS102L6	S1000	DE-102	CU38D1	GP3L-102	PT931	6TM-D1	
C114	470	500		1469-00047	DE-471	SR5T47	811-471	MCE345	MS-347	
C115	220	500		1469-00022	DE-221	SR5T22	811-221	MCE340	MS-322	
C116	.1	400	68BS104L4	P488N-1	DF-104	CU34P1		PT401	4TM-P1	
C117	.047	400	68BS473L6	BPD-05	DF-503	CU38D47		PT1417	4TM-S47	
C118	.047	400	68BS473L6	BPD-05	DF-503	CU38D47		PT1417	4TM-S47	
C119	.001	1000	68BS102L10	HVD-15-1000	DD-102	CU38D1	1R5KV-102	PT1E61	1GTM-D1	
C120	47	3000	47A459	HVD-30-47	DD30-470	VZ4GT	3KV-470	DC30447	30GA-Q47	
C121	.1	600	68BS104L6	P688N-1	DF-104	CU34P1		PT601	6TM-P1	
C122	47	2000		HVD-20-47	DD20-470	VZ4GT	3KV-470	DC30447	20GA-Q47	
C123	.01	600	68BR103L6	P688N-01		CU38B1		PT611	6TM-S1	
C124	.01	600	68BR103L6	P688N-01		CU38B1		PT611	6TM-S1	
C125	500	30000	47A31K	UV-503	TV8-503	MMU30T5			30DK-T5	

♦ Items C85A, C85B, C85C, R81A and R81B are combined in one unit.
When replacing items separately, C85B and C85C should total 250MMF.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	50KΩ	½	25C1057	F1-39	RTV-536	* QJ-708	UF54L	Brightness
B	1Meg			B2-23			UR16A	Volume
C	Switch			KB-2			U5-37	Attach to R1B.
R2A	750KΩ	½	25C1081	AB-5	A47-750-S	QU-105	U-6	Vert. Linearity
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R2A.
R3A	4Meg	½	25C1031	♦ AB-88	♦ A47-4Meg-S	♦ QU-141	♦ U-87	Height
	with 500KΩ stop							
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R3A.
R4A	1Meg with 500KΩ stop	½	25C1050	♦ AB-89	♦ A47-1Meg-S	♦ QU-137	♦ U-54	Vert. Hold
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R4A.
R5A	100KΩ	½	25C1048	AB-40	A47-100K-S	QU-121	U-41	Horizontal Hold
B	Shaft		Not Req.	AK-4	KS8-4	Not Req.	Not Req.	Attach to R5A.
R8	50Ω	2	25A1074					Dimmer-Wire wound
R7A	10KΩ	½	25B1049	AB-14	A47-10K-S	QU-116	U-30	Tone
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R7A.
R8A	15KΩ	½	25B1045	AB7-154		QU-113XX		Contrast Tapped at 5KΩ & 10KΩ.
B	Shaft		Not Req.	AK-5		Not Req.		Attach to R8A.
R9A	7500Ω	½	25C1053	AB-13	A47-7500-S	QU-115	U-20	AGC
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R9A.
R10A	2Meg	½	25C1052	AB-75	A47-2Meg-S	QU-139	U-56	Picture Guard
B	Shaft		Not Req.	AK-4	KS8-3	Not Req.	Not Req.	Attach to R10A.

♦ Concentrikit Equivalent; K-2 Kit, Base Elements & Shaft; R11-123 & P13-113 (Panel)
R13-137 & R17-303 (Rear)
76-2 (Switch)
† Universal Replacement (Mallory Exact Duplicate Part No. UE1048).
♦ Connect a 560KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
♦ Connect a 510KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R11	820Ω		23X20X103K	BTS-10K	
R12	68KΩ	1	23X20X683K	BTS-47K	
R13	10KΩ		23X20X103K	BTS-10K	
R14	130Ω		23X20X131K	BTS-130	
R15	L 5Meg		23X20X155K	BTS-L 5Meg	
R16	L 5Meg		23X20X155K	BTS-L 5Meg	
R17	100KΩ		23X20X103K	BTS-100K	
R18	1.5MΩ		23X20X158K	BTS-1.5Meg	
R19	47KΩ		23X20X473K	BTS-47K	
R20	330KΩ		23X20X334K	BTS-330K	
R21	220KΩ		23X20X224K	BTS-220K	
R22	470Ω		23X20X471K	BTS-470	
R23	15KΩ		23X20X153K	BTS-15K	
R24	220KΩ		23X20X224K	BTS-220K	
R25	10KΩ		23X20X103K	BTS-10K	
R26	4700Ω		23X20X472K	BTS-4700	
R27	15KΩ		23X20X153K	BTS-15K	
R28	100Ω		23X20X101K	BTS-100	
R29	100Ω		23X20X101K	BTS-100	
R30	56KΩ 5%		23X20X563J	BTS-56K 5% Note 1	
R31	230KΩ 5%		23X20X234J	BTS-230K 5% Note 1	
R32	3300Ω		23X20X332K	BTS-3300	
R33	1000Ω		23X20X102K	BTS-1000	
R34	82KΩ		23X20X273K		
R35	2200Ω		23X20X222K	BTS-2200	
R36	1000Ω		23X20X102K	BTS-1000	
R37	100Ω		23X20X101K	BTS-100	
R38	47Ω		23X20X470K	BTS-47	
R39	47Ω		23X20X470K	BTS-47	
R40	22KΩ		23X20X223K	BTS-22K	
R41	22KΩ		23X20X223K	BTS-22K	
R42	33KΩ		23X20X333K	BTS-33K	
R43	1000Ω		23X20X102K	BTS-1000	
R44	1000Ω		23X20X102K	BTS-1000	
R45	47Ω		23X20X470K	BTS-47	
R46	18KΩ		23X20X183K		
R47	1000Ω		23X20X102K	BTS-1000	
R48	100Ω		23X20X101K	BTS-100	
R49	47Ω		23X20X470K	BTS-47	
R50	18KΩ		23X20X183K		
R51	1000Ω		23X20X102K	BTS-1000	
R52	100Ω		23X20X101K	BTS-100	
R53	150Ω		23X20X151K	BTS-150	
R54	3300Ω		23X20X332K	BTS-3300	
R55	50000 5%	10	24BG502D	1 3AA-5000 5% Note 1	
R56	680Ω		23X20X681K	BTS-680	
R57	2200Ω		23X20X222K	BTS-2200	
R58	220KΩ		23X20X224K	BTS-220K	
R59	470KΩ		23X20X474K	BTS-470K	
R60	220Ω		23X20X472K	BTS-4700	
R61	33KΩ		23X20X333K	BTS-33K	
R62	680Ω		23X20X681K	BTS-680	
R63	470KΩ		23X20X474K	BTS-470K	
R64	15KΩ	2	23X40X153K	BTS-15K	
R65	10KΩ	1	23X30X103K	BTA-10K	
R66	47KΩ		23X20X473K	BTS-47K	
R67	33KΩ		23X20X333K	BTS-33K	
R68	10KΩ		23X20X103K	BTS-10K	
R69	1Meg		23X20X105K	BTS-1Meg	
R70	2200Ω		23X20X222K	BTS-2200	
R71	100KΩ		23X20X104K	BTS-100K	
R72	100KΩ		23X20X104K	BTS-100K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R73	47KΩ		23X20X473K	BTS-47K	
R74	270Ω		23X20X271K	BTS-470	
R75	33KΩ		23X20X333K	BTS-33K	
R76	10KΩ 5%		23X20X103J	BTS-10K 5% Note 1	
R77	10KΩ 5%		23X20X103J	BTS-10K 5% Note 1	
R78	560KΩ 5%		23X20X564J	BTS-560K 5% Note 1	
R79	5.1Meg 5%		23X30X515J	BTS-5.1Meg 5% Note 1	
R80	10Meg		23X20X106K	BTS-10Meg	
R81A	470KΩ		♦ 49A017	BTS-470K	
B	470KΩ			BTS-470K	
R82	330Ω	2	23X40X331K	BTS-330	
R83	18KΩ	2	23X40X183K	BTB-18K	
R84	33KΩ		23X20X333K		
R85	470KΩ		23X20X474K	BTS-470	
R86	33KΩ		23X20X333K	BTS-33K	
R87	1.5Meg		23X20X155K	BTS-1.5Meg	
R88	330KΩ		23X20X334K	BTS-330K	
R89	100KΩ		23X20X104K	BTS-100K	
R90	27KΩ	1	23X20X273K	BTA-27K	
R91	470KΩ		23X20X474K	BTS-470K	
R92	8200Ω	2	23X40X822K	BTB-8200	
R93	18KΩ	2		BTB-18K	
R94	2200Ω		23X20X222K	BTS-2200	
R95	2200Ω		23X20X222K	BTS-2200	
R96	22KΩ		23X20X223K	BTS-22K	
R97	8200Ω		23X20X822K	BTS-8200	
R98	8200Ω		23X20X822K	BTS-8200	
R99	820KΩ			BTS-820K	
R100	680KΩ		23X20X684K	BTS-680K	
R101	3900Ω 5%			BTS-3900 5%	
R102	1Meg		23X20X105K	BTS-1Meg	
R103	3300Ω	2	23X40X332K	BTB-3300	
R104	470Ω	2	23X40X471K	BTB-470	
R105	560Ω				
R106	560Ω				
R107	68KΩ		23X20X683K	BTS-68K	
R108	1MEg		23X20X105K		
R109	1Meg		23X20X105K		
R110	120KΩ	1			
R111	1Meg		23X20X105K		
R112	47KΩ		23X20X473K		
R113	100Ω		23X20X101K		
R114	47KΩ	1	23X20X473K		
R115	47KΩ	1	23X20X473K		
R116	100Ω	2	23X40X101K		
R117	18KΩ				
R118	18KΩ	2	23X40X103K		
R119	47KΩ		23X20X473K		
R120	150KΩ		23X20X154K		
R121	18KΩ		23X20X183K		
R122	680KΩ		23X20X684K		
R123	100Ω		23X20X101K		
R124	47Ω		23X20X470K		
R125	47KΩ	2	23X40X823K		
R126	100Ω	2	23X40X101K		
R127	100Ω				
R128	3.5Ω		23X20X033K	BW-3.3	
R129	1Meg	1	23X30X105K	BTA-1Meg	
R130	10KΩ	10	24BG103E	1 3AA-10K	
R131	180Ω	15	24B97T		Note 1
R132	150KΩ		23X20X154K	BTS-150K	
R133	270KΩ		23X20X274K	BTS-270K	

Note 1. Manufacturer states to use exact replacement part only.
♦ Items R81A, R81B, C85A, C85B, C85C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI	RATING SEC 1	RATING SEC 2	RATING SEC 3	REPLACEMENT DATA Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ 1.98A	530VCT @ .220A	5V @ 6A SEC 4 6.3V @ 9A	6.3V @ 6.5A SEC 5 6.3V @ 1.2A	52C291					

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA Hallicrafters PART No.	Halldorson PART No.	Merit TYPE No.	RCA PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Osc. Trans.	55B221	B6700	A-3000	209T1	V403	A-81U	24A87	A-95X
T3	Horiz. Output Trans.	55D219			232T1 *			FLY-38 *	D-35 *
T4	Vert. Output Trans.	55A217	21R00(2)	A-3037(3)		V313 (4)	A-81R3(5)	26S52 (6)	A-102X(5)
T5A	Yoke-Horiz. (58.5MH)	53C305 (7)	DF605 (8)	MDF-72	222D1 (9)	T70F18/43	DY-11A (7)	Y-9 (7)	Y-22-1 (5)
B	Vert. (37MH)								
T6	Horiz. Lin. Coil (1.3-10MH)	51A1470	RF800 (10)	MWC-4 (11)	213R1(7)	201R10 (7)	WC-8 (7)	WC-23 (7)	WC-12 (7)
T7	Width Coil (3.5-28MH)	51B1673	RF800 (7) (10)	MWC-4 (11)	215R1 (7)	201R10 (7)	WC-8 (7)	WC-20 (7) (10)	WC-11 (7) (10)

① Connect as auto transformer.
② Use 12.5 to 1 turns ratio.
③ Drill new mounting hole (s).
④ Includes capacitor C123, resistors R105, R106 and R127.
⑤ Connect horizontal damping network across terminals #3 and #7. Use original if necessary.
⑥ Remove capacitor from terminals #1 and #2. Use original horizontal yoke damping network if necessary.
⑦ Drill new mounting hole or use original slider, clip and core.
⑧ Use terminals #3 and #4.
⑨ Use blue and green terminals.
⑩ Use terminals #1 and #2.
⑪ Use red and blue terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
9		10	3			3	10
7		9			Jumper 2 & 10	Jumper 9 & 7	
5		8			Jumper 3 & 10	8	
4		5			6	5	
7		3			4	3	
3		2			AFC Winding	2	
1		1			AFC Winding	1	
Connect Width Coil Across ⟶	4 & 7	5 & 3			6 & 4	5 & 3	
Special Notes ⟶					12		

12 If the picture is out of phase, reverse AFC winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA Hallicrafters PART No.	Halldorson PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T8	6.6KΩ	3-4Ω	55B222	Z3502	A3949	25S49	S-52	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP	REPLACEMENT DATA Hallicrafters PART No.	QUAM PART No	RCA TYPE No	NOTES
SP1	8"	PM	3-4Ω	85A151	8A21	208S2	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	ANT Ant. Coil	0Ω						
L2	UHF Ant. Coil	0Ω						
L3	Fil. Choke	0Ω						
L4	Fil. Choke	0Ω						
L5	Cathode Choke	0Ω						
L6	UHF Osc. Coupling Coil	0Ω						
L7	UHF Osc. Coupling Coil	0Ω						
L8	UHF IF Output Coil	.1Ω		131A394				Tapped
L9	UHF IF Coil	0Ω						
L10	RF Coil	1.4Ω						
L11	IF Trap	.1Ω						
L12	UHF IF Trap	0Ω						
L13	UHF IF Coil							
L14	VHF Ant. Trap	0Ω		131A153				♦ Wound on 66MMF cap.
L15	VHF Ant. Trap	0Ω		131A154				Wound on 68MMF cap.
L16A	VHF Ant. Coil	0ΩCT	0Ω	131A176				Channel 2
B	VHF Ant. Coil	0Ω CT	0Ω	131A177				Channel 3
C	VHF Ant. Coil	0Ω CT	0Ω	131A178				Channel 4
D	VHF Ant. Coil	0Ω CT	0Ω	131A179				Channel 5
E	VHF Ant. Coil	0Ω CT	0Ω	131A180				Channel 6
F	VHF Ant. Coil	0Ω CT	0Ω	131A181				Channel 7
G	VHF Ant. Coil	0Ω CT	0Ω	131A182				Channel 8
H	VHF Ant. Coil	0Ω CT	0Ω	131A183				Channel 9
I	VHF Ant. Coil	0Ω CT	0Ω	131A184				Channel 10
J	VHF Ant. Coil	0Ω CT	0Ω	131A185				Channel 11
K	VHF Ant. Coil	0Ω CT	0Ω	131A186				Channel 12
L	VHF Ant. Coil	0Ω CT	0Ω	131A187				Channel 13
L17	IF Trap	1Ω		131A155				
L18	Fil. Choke	0Ω		131A049				
L19	Neut. Coil	0Ω		131A050				
L20A	RF, Mixer Grid & Osc. Coils	0Ω		131A188				Channel 2
B	RF, Mixer Grid & Osc. Coils	0Ω		131A189				Channel 3
C	RF, Mixer Grid & Osc. Coils	0Ω		131A190				Channel 4
D	RF, Mixer Grid & Osc. Coils	0Ω		131A191				Channel 5
E	RF, Mixer Grid & Osc. Coils	0Ω		131A192				Channel 6
F	RF, Mixer Grid & Osc. Coils	0Ω		131A193				Channel 7
G	RF, Mixer Grid & Osc. Coils	0Ω		131A194				Channel 8
H	RF, Mixer Grid & Osc. Coils	0Ω		131A195				Channel 9
I	RF, Mixer Grid & Osc. Coils	0Ω		131A196				Channel 10
J	RF, Mixer Grid & Osc. Coils	0Ω		131A197				Channel 11
K	RF, Mixer Grid & Osc. Coils	0Ω		131A198				Channel 12
L	RF, Mixer Grid & Osc. Coils	0Ω		131A199				Channel 13

HALLICRAFTERS MODELS 21K2000B, 21K2010M, 21K211M, 21K2208, 21K221B, 21K2308, 21K323M (Ch. A1400D, B1400D)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L	RF, Mixer Grid & Osc. Coils	0Ω		121A199				Channel 13
L21	Fil. Choke	0Ω		121A051				
L22	Feedback Coil	1.5Ω		121A152				
L23	RF Coil	0Ω		121A151				
L24	Conv. Plate	.1Ω		121A150				
L25	RF Coil	4.2Ω		53A307	19-1006		4624	16 Microhenries
L26	1st. Video IF Grid	.1Ω		50C604				
L27	1st. Video IF Plate	.1Ω		50C610				
L28A	41.25MC Trap	.1Ω		50C605				
B	47.25MC Trap	.1Ω						
L29	2nd. Video IF	.1Ω		50C609				
L30	3rd. Video IF	.1Ω		50C606				
L31	Fil. Choke	0Ω		53A282	19-3001		6175	.4 Microhenry
L32	4th. Video IF	.1Ω		50C607				
L33	Series Peaking Coil	4.2Ω		53A307	19-1006		4624	16 Microhenries
L34	Shunt Peaking Coil	8.2Ω		51B1740	19-3300 *		6155 *	286 Microhenries, wound on 15KΩ resistor
L35	Series Peaking Coil	4Ω		51B1741	19-3093 ■	TV-181 ■	6177 ■	90 Microhenries, wound on 10KΩ resistor
L36	4.5MC Trap	1.1Ω		51B1542	20-1004	TV-151	1469	
L37	Shunt Peaking Coil	11.5Ω		51B1821	19-3500 ▲		6174 ▲	495 Microhenries, wound on 1KΩ resistor
L38	Series Peaking Coil	5Ω		51B1739	19-3125 ♦		6153 ♦	126 Microhenries, wound on 12KΩ resistor
L39	Series Peaking Coil	4.2Ω		53A307	19-1006		4624	16 Microhenries
L40	Fil. Choke	0Ω		53A282	19-3001		6175	.4 Microhenry
L41	Sound IF	1.5Ω		51B1715			1470-A †	
L42	Ratio Detector	4Ω	.7ΩCT	50C473	17-1033	TV-110	1468	Tertiary winding -.4Ω
L43	RF Choke	4.2Ω		53A307	19-1006		4624	16 Microhenries
L44	RF Choke	4.2Ω		53A307	19-1006		4624	16 Microhenries

* Parallel with 15KΩ resistor.
■ Parallel with 10KΩ resistor.
▲ Parallel with 1KΩ resistor.
♦ Parallel with 12KΩ resistor.
† Use adaptor plate.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L45	170Ω		51B1716	19-1577		6324			HS-6	Tapped ② 88Ω

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L46	.220A	72Ω	1.1HY	56B165	C5040	C2994	C2327	26C41	C-21X ①

① Drill new mounting holes.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA Hallicrafters PART No. FUSE	Hallicrafters PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG P/T	4A 125V	39A388		315004. (3AG P/T S/B 4A)		MDV4	
M2	3AG P/T	3/8A 125V	39A383		315.375 (3AG P/T S/B 3/8A)		MDV 3/8	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA Hallicrafters PART No.	REPLACEMENT DATA SYLVANIA PART No.	NOTES
M3	1N82	121A295	1N82 or 1N82A	UHF Mixer (Clip in)
M4	1N60 *		1N60	Video Det. (Pigtail)

* Some versions use crystal diode type 1N64 in this application.

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M5	Dial Light	39A043	#44
M6	Tuner	1E1733	VHF - Ch. B1400D
	Tuner	1E1734	VHF - Ch. A1400D
M7	Tuner	1E1855	UHF - Ch. A1400D
M8	Video Det. Assy.	50C608	Includes M4, coils and capacitor
M9	Switch	60C601	VHF-UHF - Ch. A1400D
M10	Focus Magnet	21C164	Includes centering device
M11	Ion Trap	21A101	
B3	Trimmer Cap.	44A361	Horiz. Drive (80-350MMF)
	Pointer	82A245	VHF
	Pointer	82A244	UHF
	Dial Scale	83C447	VHF
	Dial Scale	83C448	VHF-UHF
	Knob	8B2244	Knurled, plastic shaft extension

COMPARISON OF 1400D SERIES CHASSIS (CONT.)

MODIFICATION VIII

LOCATION OF CHANGE	CHANGE MADE
A. AGC network (pins 5 and 6 of V14). B. 1st. and 2nd. Video IF amplifiers.	A. R78 is increased from 560KΩ to 680KΩ. B. V5 and V6 changed to 6CF6 tubes.

MODIFICATION IX

LOCATION OF CHANGE	CHANGE MADE
A. 260V lead into tuner. B. AGC network (pins 5 and 6 of V14). C. Keyed AGC cathode (pin 7 of V10).	A. A 3900Ω, 2 watt resistor added in the 260V line feeding the tuner. B. R78 is replaced by a 270KΩ and a 330KΩ connected in series. C. The .1MFD capacitor connected from pin 7 of V10 to ground is deleted.

MODIFICATION X

LOCATION OF CHANGE	CHANGE MADE
A. Grid of 3rd. Video IF (pin 1 of V7). B. Grid of 4th. Video IF (pin 1 of V8). C. Cathode of 4th. Video IF (pin 2 of V8). D. Pin 6 of V8. E. Video detector assembly (M8). F. Video detector assembly (M8). G. Terminal A of M8. H. Video output cathode (pin 1 of V9).	A. R46 is increased from 18KΩ to 27KΩ. B. R50 is increased from 15KΩ to 18KΩ. C. C63 is decreased from 5000MMF to 1000MMF. D. C62 is increased from 680MMF to 1000MMF. E. A 1000Ω resistor in parallel with a 1000MMF capacitor is added from terminal "A" of M8 to ground. F. An 82KΩ, 1 watt resistor is added between terminals "A" and "F" of M8. G. L34 is removed from ground and connected to terminal "A" of M8. H. A 68Ω, ½ watt resistor added from pin 1 of V9 to ground.

MODIFICATION XI

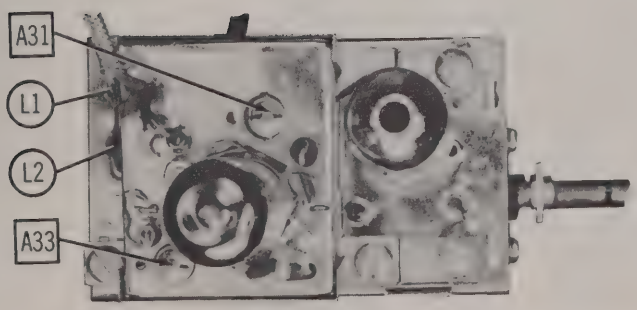
LOCATION OF CHANGE	CHANGE MADE
A. Pin 10 of V26.	A. C71 is removed from ground and connected to the 260V line.

MODIFICATION XII

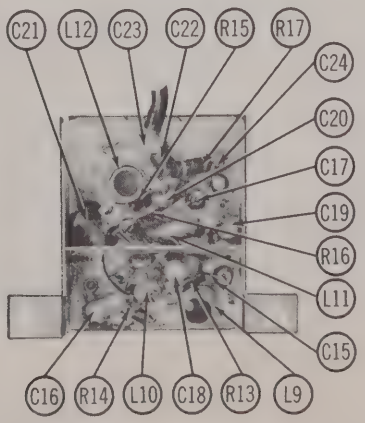
LOCATION OF CHANGE	CHANGE MADE
A. Pin 6 of V5. B. Pin 6 of V6. C. Pin 6 of V7.	A. C47 is increased from 820MMF to 1500MMF. B. C54 is increased from 820MMF to 1500MMF. C. C58 is increased from 820MMF to 1500MMF.

MODIFICATION XIII

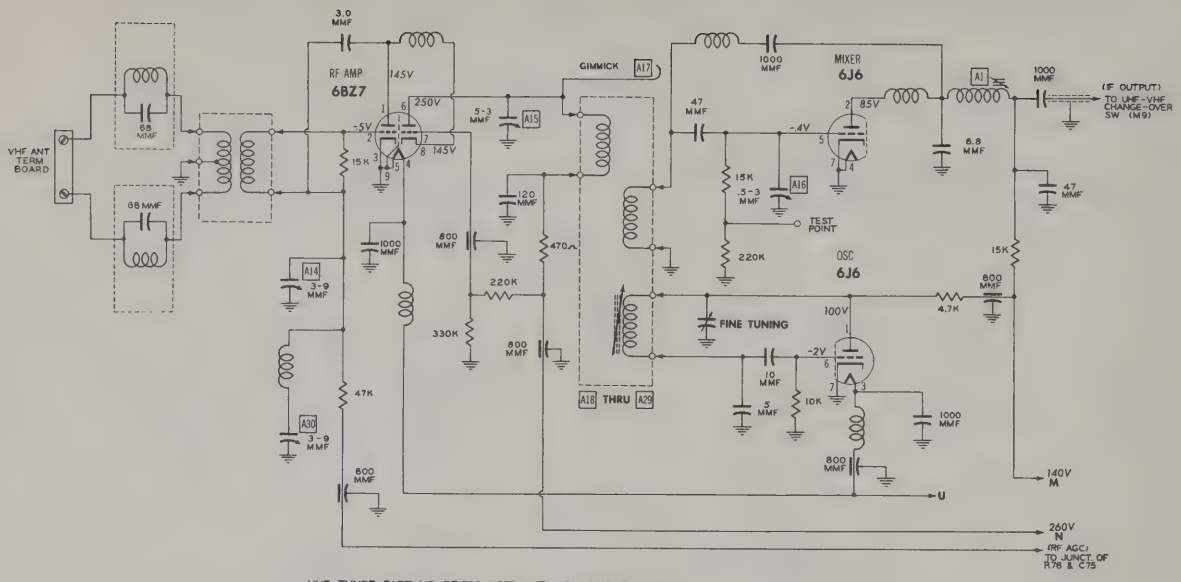
LOCATION OF CHANGE	CHANGE MADE
A. Video output cathode (pin 1 of V9).	A. A 68Ω, ½ watt resistor added from pin 1 of V9 to ground.



UHF TUNER TOP VIEW



UHF TUNER SUB-CHASSIS



VHF TUNER PART NO. TE1733 USED WITH CHASSIS B1400D

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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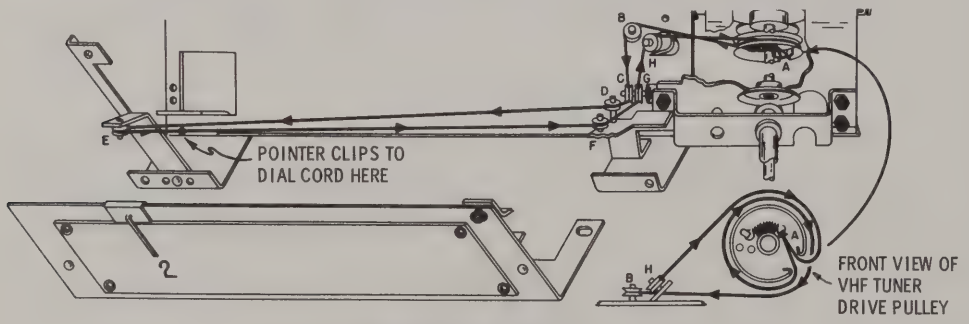
ALTERNATE TUNER SCHEMATIC

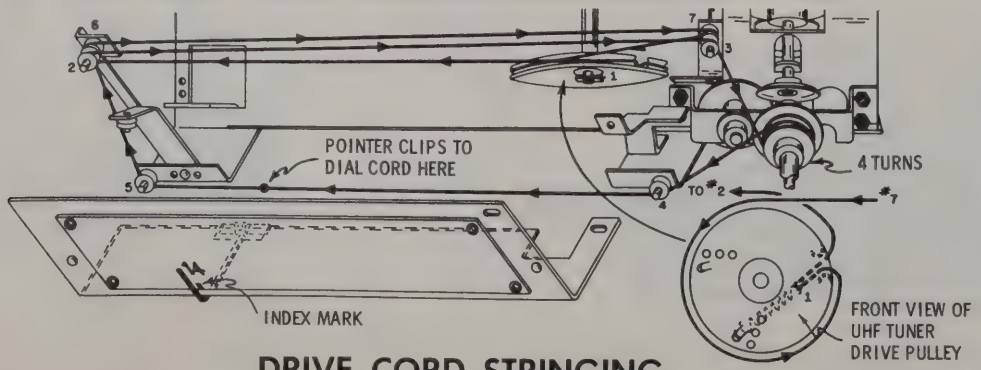
VHF DRIVE CORD STRINGING

1. Cut a 52" length of dial cord and tie one end to the dial spring.
2. Turn the VHF tuner channel selector switch to channel 2 position.
3. Place the free end of the dial cord spring over the hook in the pulley on the front of the VHF tuner. See Fig. 1.
4. Stretch the spring and take one full turn around the pulley before following the sequence as shown in Fig. 1.
5. From point "H" return the end of the dial cord over the top of the pulley to point "A" and tie the cord to the spring . Be sure that the string is sufficiently tight to stretch the spring and thereby maintain proper string tension.
6. Cut off any surplus string and place a drop of quick drying cement on the knots to prevent them from working loose.
7. Position the pointer over channel 2 on the dial and clip the pointer to the dial string. A drop of cement may be used to insure that the pointer will not slip.
8. Check the action of the system to be sure that it operates freely and the pointer indicates the proper VHF channel.



UHF DRIVE CORD STRINGING

1. Cut an 80" length of dial cord and tie one end to the dial spring.
2. Turn the UHF tuner drive pulley to the full counter clockwise position (Channel 14) Fig. 2.
3. Place the free end of the dial cord spring over the hook in the back side of the pulley.
4. Stretch the spring and pass the string out the the notch in the edge of the pulley and up over the top of the pulley to position 2 and the on to 3. From position 3 take four full turns counter clockwise around the large pulley on the fine tuning shaft before continuing on to points 4, 5, 6 and 7. From point 7 take approximately a 3/4 turn around the UHF drive pulley and pass the dial cord through the notch in the pulley rim.
5. Tie the dial cord to the dial spring at 1 and cut off any surplus string. Place a drop of quick drying cement on the knots to prevent them from working loose.
6. Position the UHF pointer over the index mark on the left end of the UHF dial scale and clip the pointer to the dial string. A drop of cement may be used to insure that the pointer will not slip on the string.
7. Check the action of the system to be sure that is operates freely and the pointer indicates the proper UHF channel.



DRIVE CORD STRINGING

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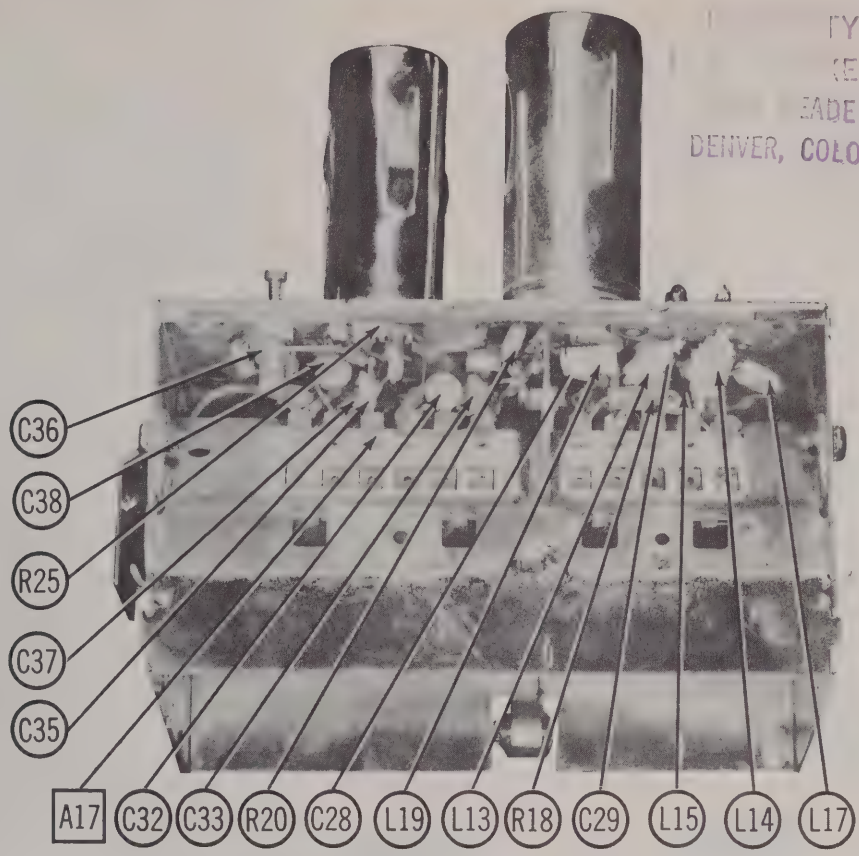
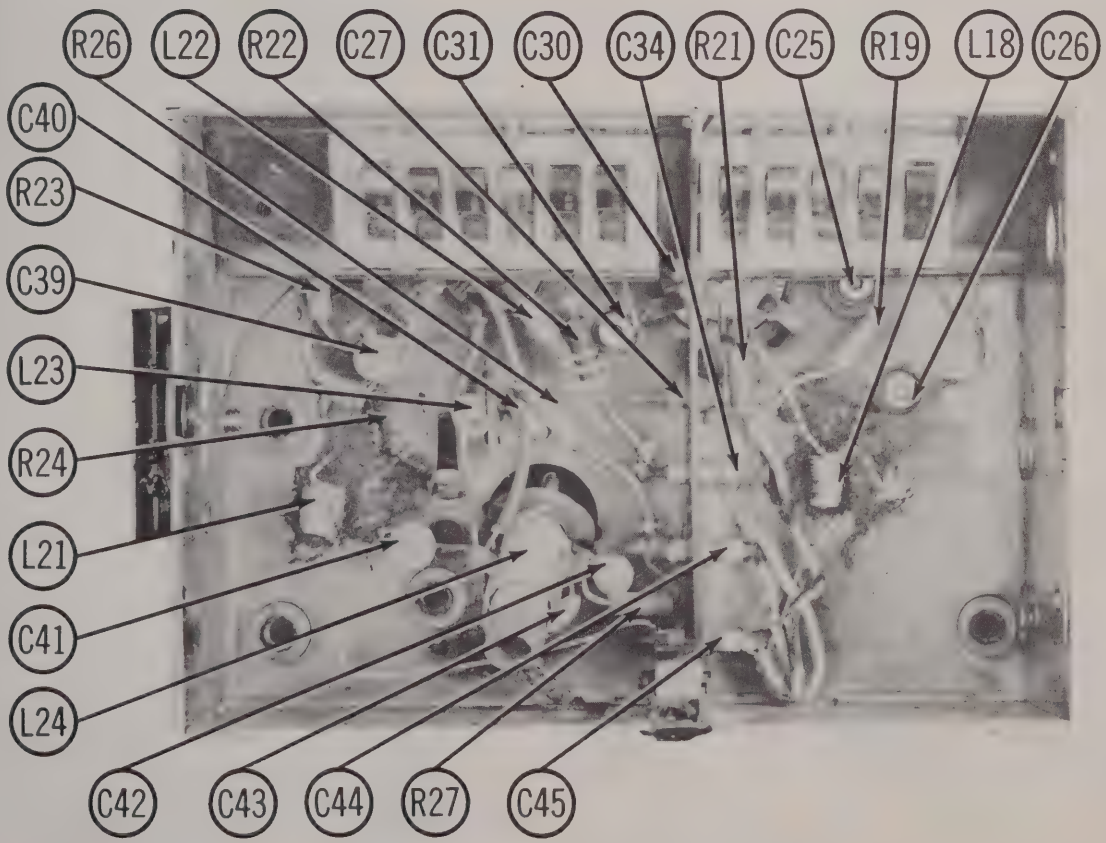
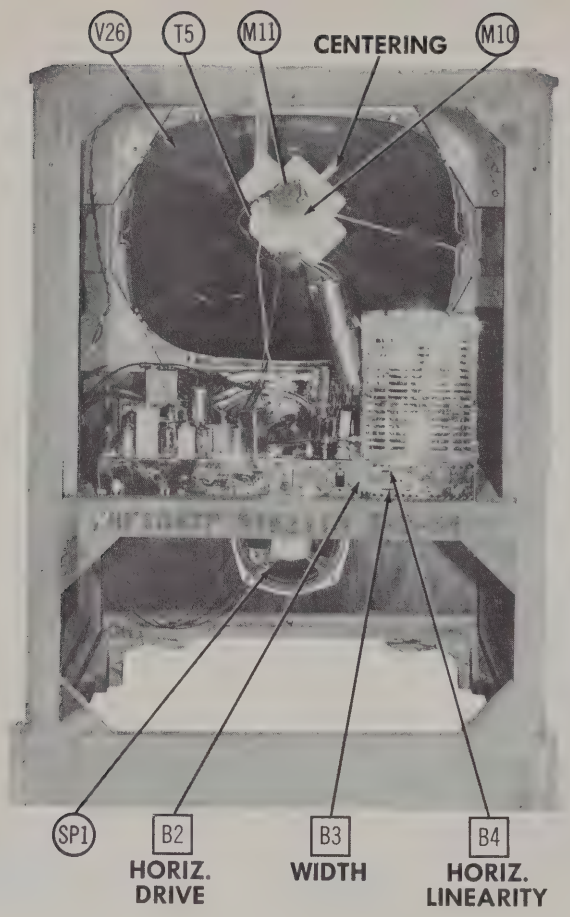


VHF TUNER RIGHT SIDE



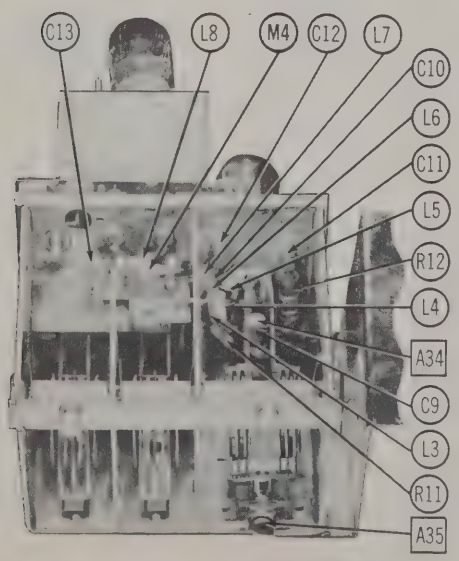
VHF TUNER BOTTOM VIEW



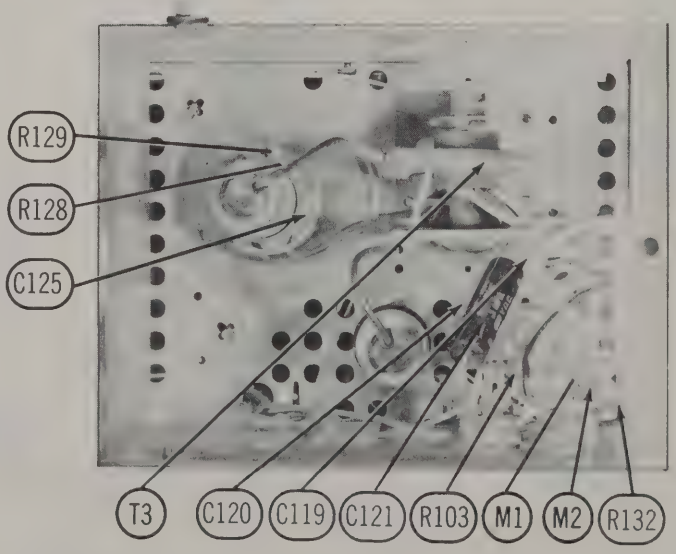
CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in the strongest TV station in that area, preferably a test pattern. Set the zero scale on center and connect the DC probe of a VTVM to point (F). Common to chassis. Set the horizontal hold control to the center of its range and adjust the horizontal oscillator coil (B1) until the picture synchronizes horizontally. The VTVM should read a zero DC voltage, if necessary slightly readjust B1. Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right. Adjust the width slug (B3) for a picture slightly wider than necessary to fill the picture mask horizontally. Adjust the horizontal drive trimmer (B2) as far clockwise as possible without the presence of vertical white lines or compression near the center of the picture.



UHF TUNER SIDE VIEW



HIGH VOLTAGE COMPARTMENT

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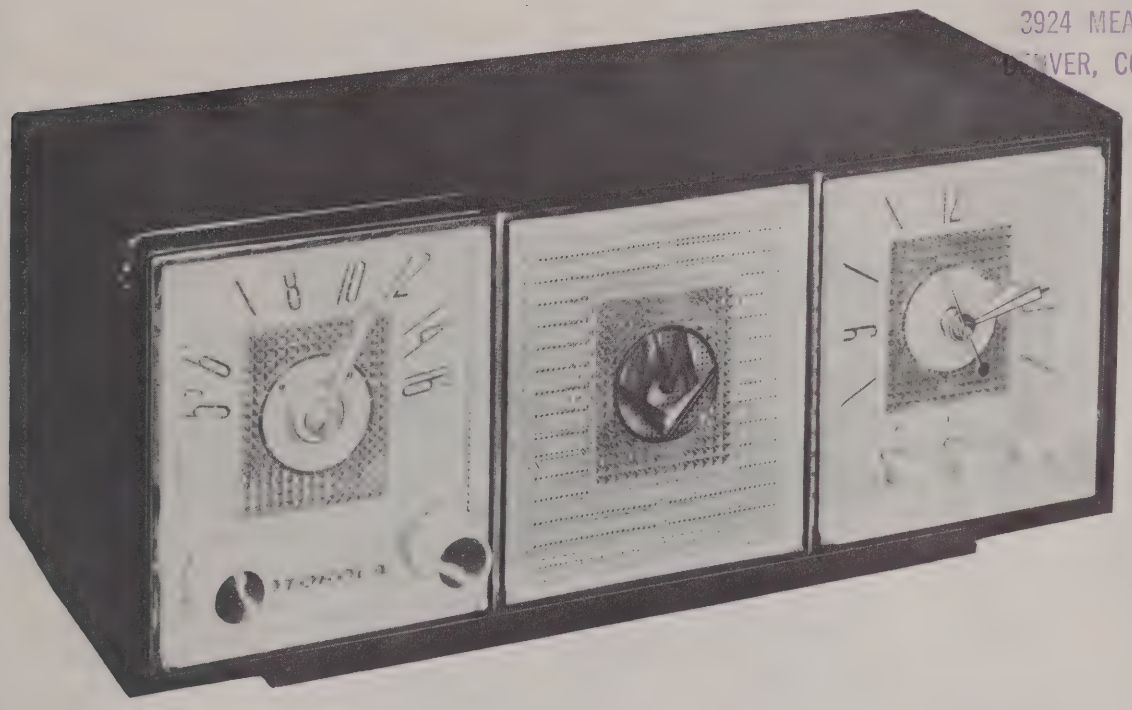

MOTOROLA
MODELS 56CJ1, 56CJ2

TRADE NAME	Motorola Models 56CJ1, 56CJ2 (Ch. HS-499)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det. -AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to outer edges of chassis.	455KC (400% Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop (Radiated)	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

MOTOROLA
Model 56CJ1 (Ch. HS-499)

PARTS LIST AND DESCRIPTIONS (Continued)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.8KΩ	3-4Ω	25K634412-H	Z1101 ①	A-3025①	A-3332①		A-12X ①	① Use original channel

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■ 50	150	23B632015	AFH2-15	B015	FP213	TMD12	D-065	TVL-2432
B	▲ 30	150							

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	50C634396	4A07	223S1	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	200	8B120842	BPD-05	DF-503			PTS415	2SE-S47	
C3	.05	400	8K121268	BPD-05	DF-503			PTS415	2SE-S47	Note 1
C4	5000		21R121165	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C5A	220		♦ 21B630180	♦ PA299	♦†PC-158					
B	5000									
C	5000									
D	250									
E										
C6	10000		21R120853	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C7	.05	400	8K121268	BPD-05	DF-503			PTS415	4SE-S47	

Note 1. Not used in some versions.
♦ Items C5A, C5B, C5C, C5D, C5E, R7A, R7B, and R7C are combined in one unit. When replacing items separately, C5D and C5E should total 250MMF.
† Reverse Leads numbered 5 and 6.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.3Ω		1V634426				Includes cabinet back
L2	Osc. Coil	1Ω	12Ω	24B631990				
L3	Input IF	15Ω		24K634459				
L4	Output IF	14Ω	20Ω	24K632039				

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Tuning Cap.	19C634219	2 Gang
M2	Clock	72D634046	
	Cabinet	16E634209	Model 56CJ1
	Cabinet	16K634210	Model 56CJ2
	Knob	36A634240	Tuning
	Knob	36A634241	Volume
	Knob	36K634242	Clock (3 used)
	Crystal	61C634223	Clock
	Crystal	61K634224	Radio
	Dial Pointer	52A634255	
	Dial Scale	34D634211	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	18B634218					Volume-Tap at 300KΩ

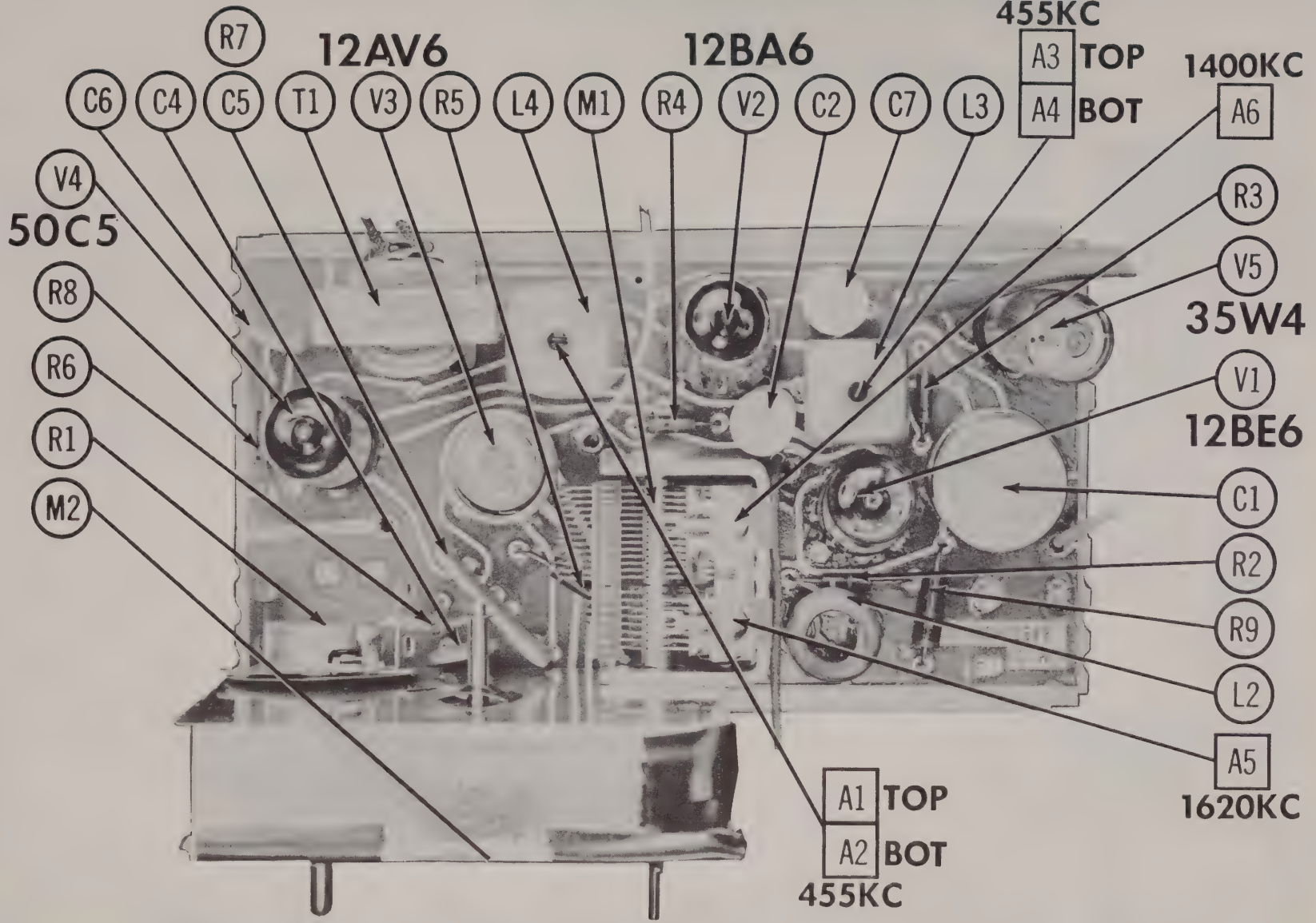
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	22KΩ		6R6028	BTS-22K	
R3	1Meg		6R6004	BTS-1Meg	
R4	100Ω		6R6018	BTS-100	
R5	3.3Meg		6R2118	BTS-3.3Meg	
R6	33KΩ		6R6012	BTS-33K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R7A	6.8Meg		♦ 21B630180	BTS-6.8Meg	
B	470KΩ			BTS-470K	
C	470KΩ			BTS-470K	
R8	150Ω		6R3992	BTS-150Ω	
R9	1000Ω	1	6K119404	BTA-1000	

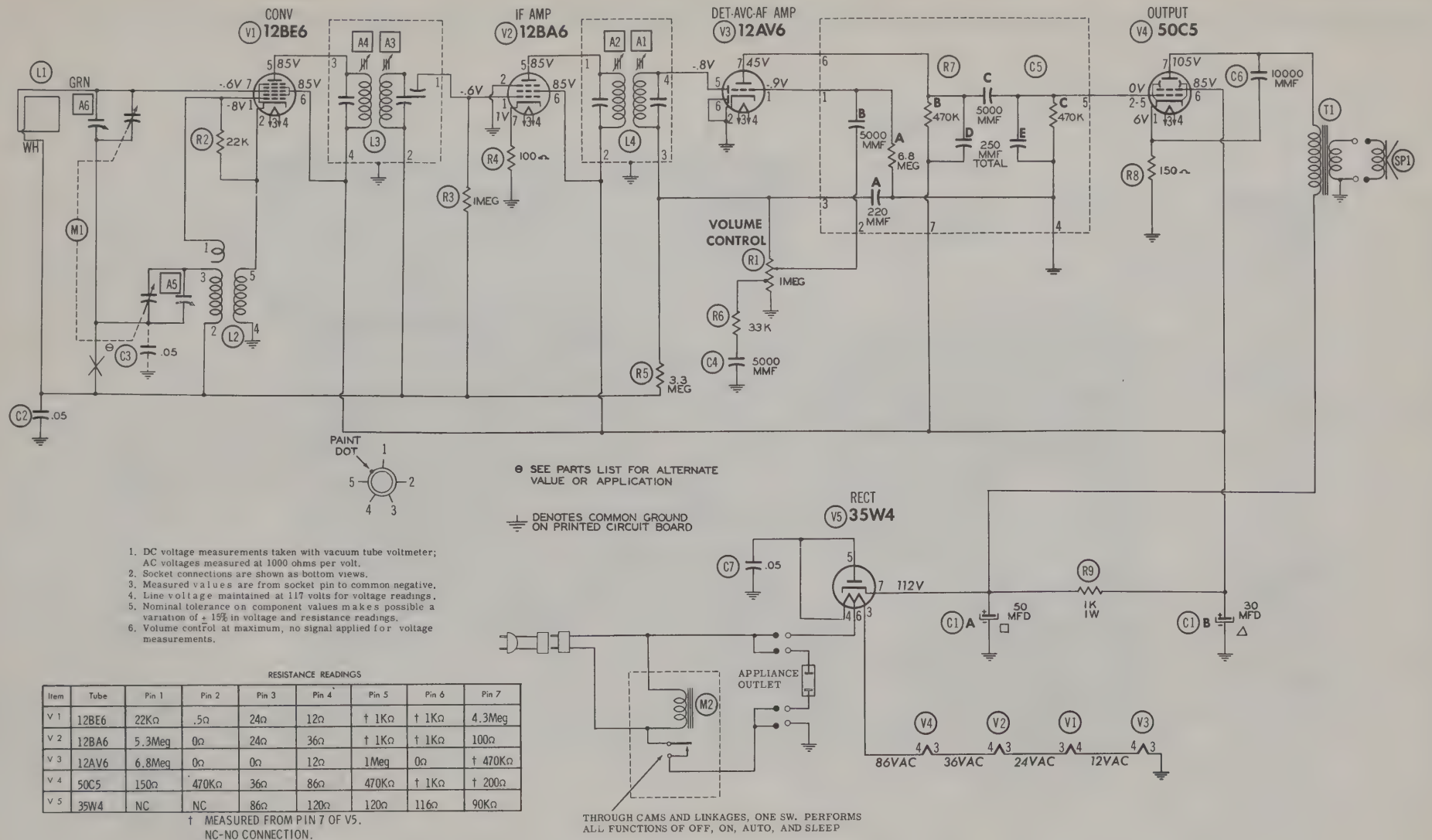
♦ Items R7A, R7B, R7C, C5A, C5B, C5C, C5D, C5E are combined in one unit.



CHASSIS TOP VIEW

MOTOROLA
Model 56CJ1 (Ch. HS-499)

SET 322 FOLDER 9



Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

⏚ DENOTES COMMON GROUND ON PRINTED CIRCUIT BOARD

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	24Ω	12Ω	† 1KΩ	† 1KΩ	4.3Meg
V 2	12BA6	5.3Meg	0Ω	24Ω	36Ω	† 1KΩ	† 1KΩ	100Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	1Meg	0Ω	† 470KΩ
V 4	50C5	150Ω	470KΩ	36Ω	86Ω	470KΩ	† 1KΩ	† 200Ω
V 5	35W4	NC	NC	86Ω	120Ω	120Ω	116Ω	90KΩ

† MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.

THROUGH CAMS AND LINKAGES, ONE SW. PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO, AND SLEEP

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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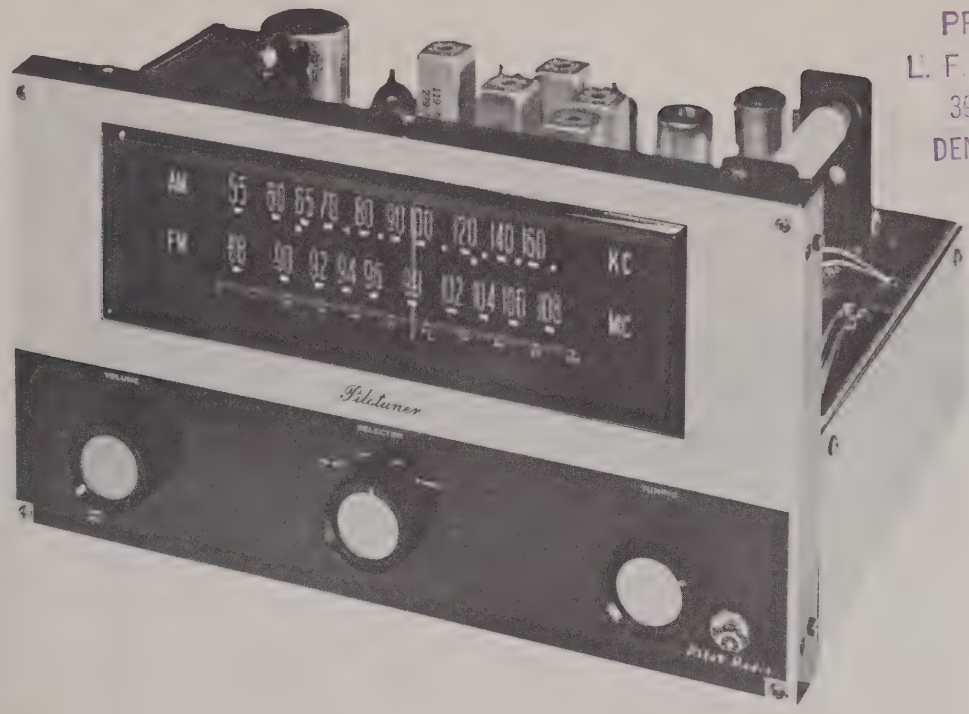
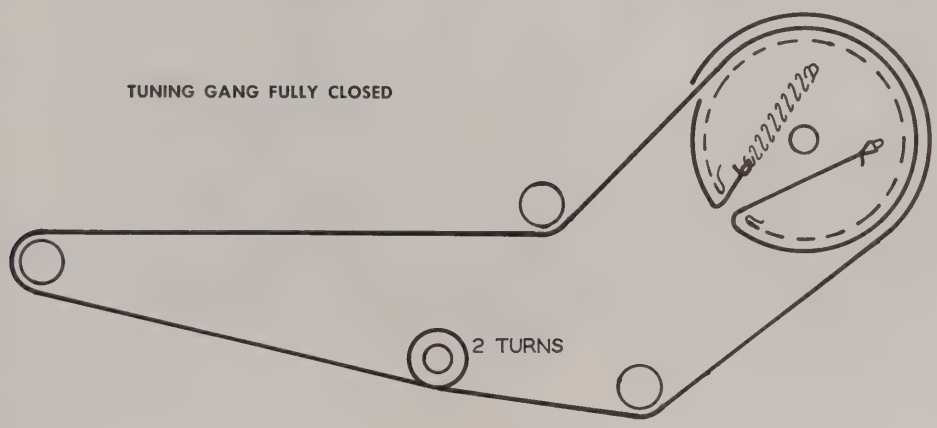


PILOT
MODEL AF-724

PILOT
MODEL AF-724

TRADE NAME	Pilot Model AF-724		
MANUFACTURER	Pilot Radio Corp., 37-06 36th St., Long Island City 1, N. Y.		
TYPE SET	AC Operated FM-AM Superheterodyne Tuner		
TUBES	Eight		
POWER SUPPLY	105-120 Volts AC-60 Cycles	RATING	.26 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540KC-1700KC	FREQ. MOD.	88MC-108MC



DIAL CORD STRINGING

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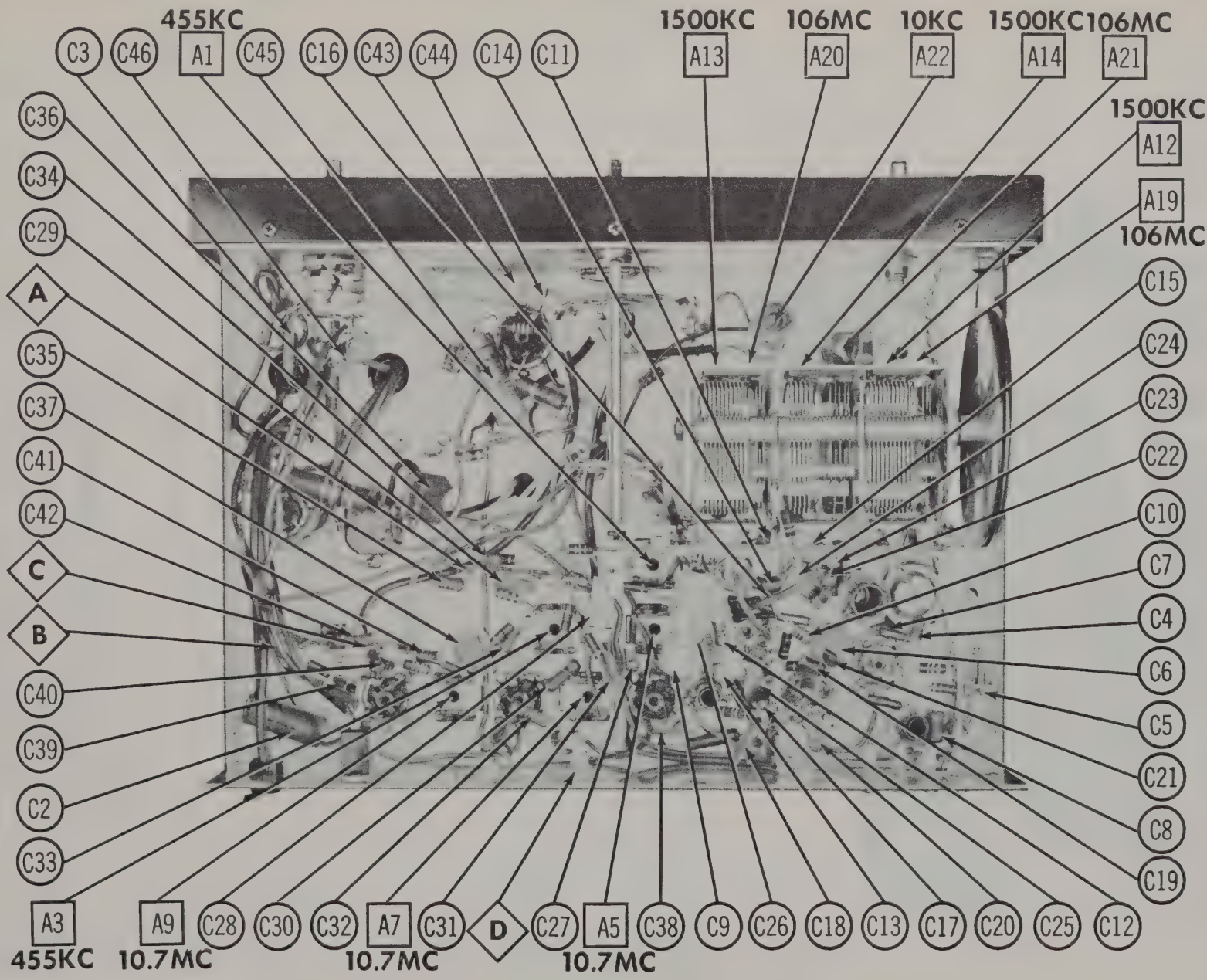
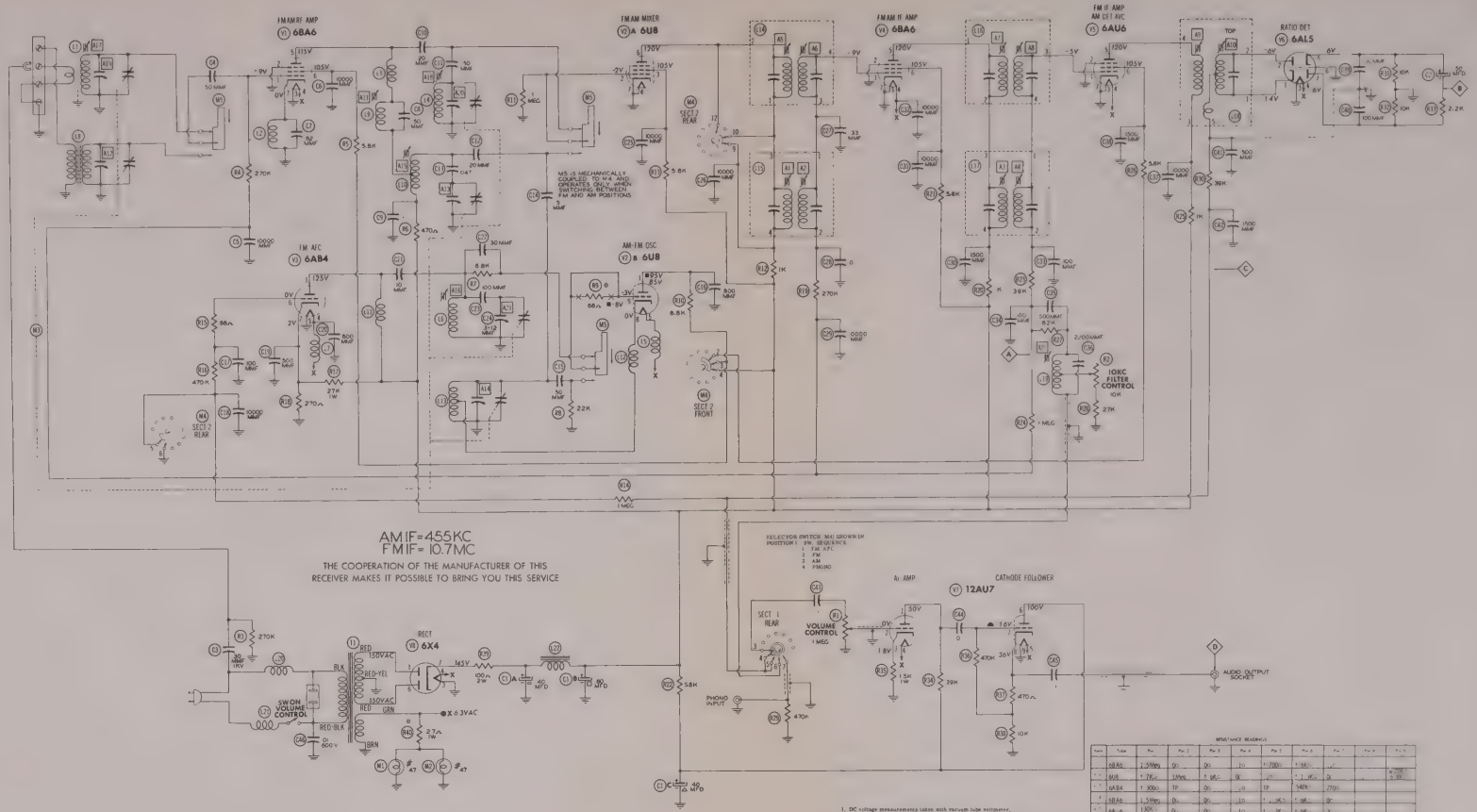


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



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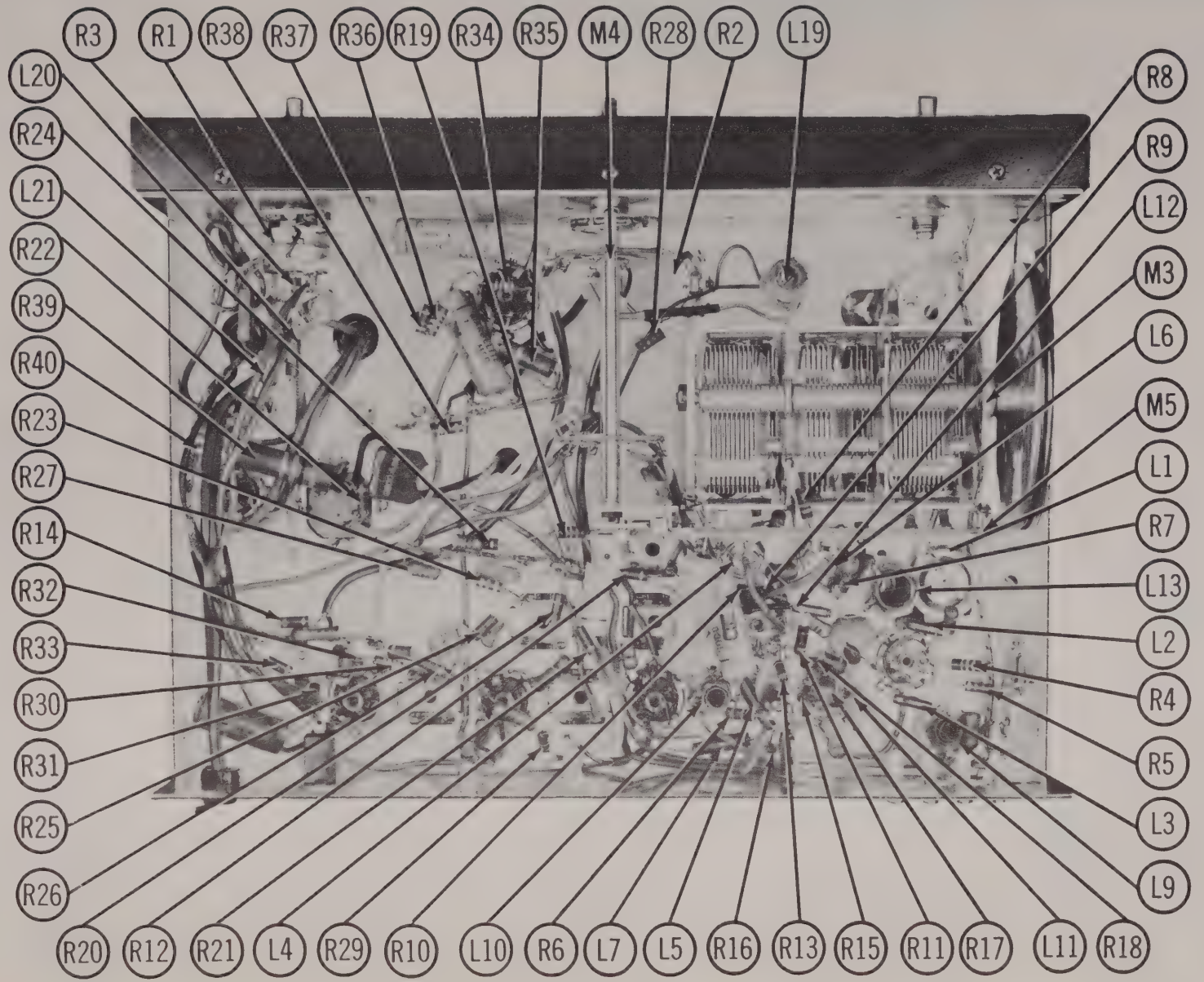


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PAGE 5

PILOT
Model AF-724

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn tuning gang fully closed. Set pointer to coincide with "O" on linear logging scale.
Allow 30 minute warm-up period.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

FM-AM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to pin 2 (grid) of 6U8 (V2). Low side to chassis.	455KC (400∿ Mod.)	AM	55	DC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	"	10.7MC (Unmod.)	FM	88	DC probe to point (B). Common to chassis.	A5, A6, A7, A8, A9	"
3.	"	"	"	"	"	DC probe to point (C). Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
2.	.01MFD	High side to pin 2 (grid) of 6U8 (V2). Low side to chassis.	10.7MC (450KC Swp)	FM	88	Vert. amp. to point (B). Low side to chassis.	A5, A6, A7, A8, A9	Disconnect stabilizing capacitor (C2). Adjust for maximum amplitude and symmetry similar to Fig. 1.
3.	"	"	"	"	"	Vert. amp. to point (C). Low side to chassis.	A10	Reconnect stabilizing capacitor (C2). Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

10KC WHISTLE FILTER ADJUSTMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.		High side to point (A). Low side to chassis.	10KC	AM	55	Vert. Amp. across point (D).	A22, R2 Filter Control	Adjust for MINIMUM 10KC response curve.

FM-AM RF ALIGNMENT

AFC off for FM RF Alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	200MMF	High side thru 200MMF to AM antenna terminal. Low side to chassis.	455KC	AM	55	DC probe to point (A). Common to chassis.	A11	Adjust for MINIMUM deflection.
6.	"	"	1500KC	"	150	"	A12, A13, A14	Adjust for maximum deflection.
7.	"	"	600KC	"	60	"	A15	Adjust for maximum deflection while rocking tuning gang.
8.	270Ω Carbon Resistors	High side to FM antenna terminal. Low side to chassis.	90MC	FM (AFC off)	90	DC probe to point (B). Common to chassis.	A16, A17, A18	Adjust for maximum deflection.
9.	"	"	106MC	"	106	"	A19, A20, A21	"

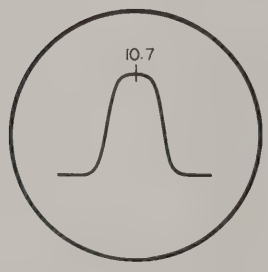


FIG. 1

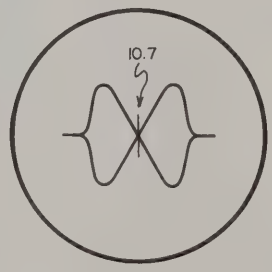


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM-AM RF Amplifier	6BA6	
V2	FM-AM Mixer-Osc.	6U8	
V3	FM AFC	6AB4	
V4	1st FM-AM IF Amplifier	6BA6	

ITEM No.	USE	TYPE	NOTES
V5	2nd FM IF Amplifier-AM Det. -AVC	6AU6	
V6	Ratio Detector	6AL5	
V7	AF Amplifier-Cathode Follower	12AU7	
V8	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

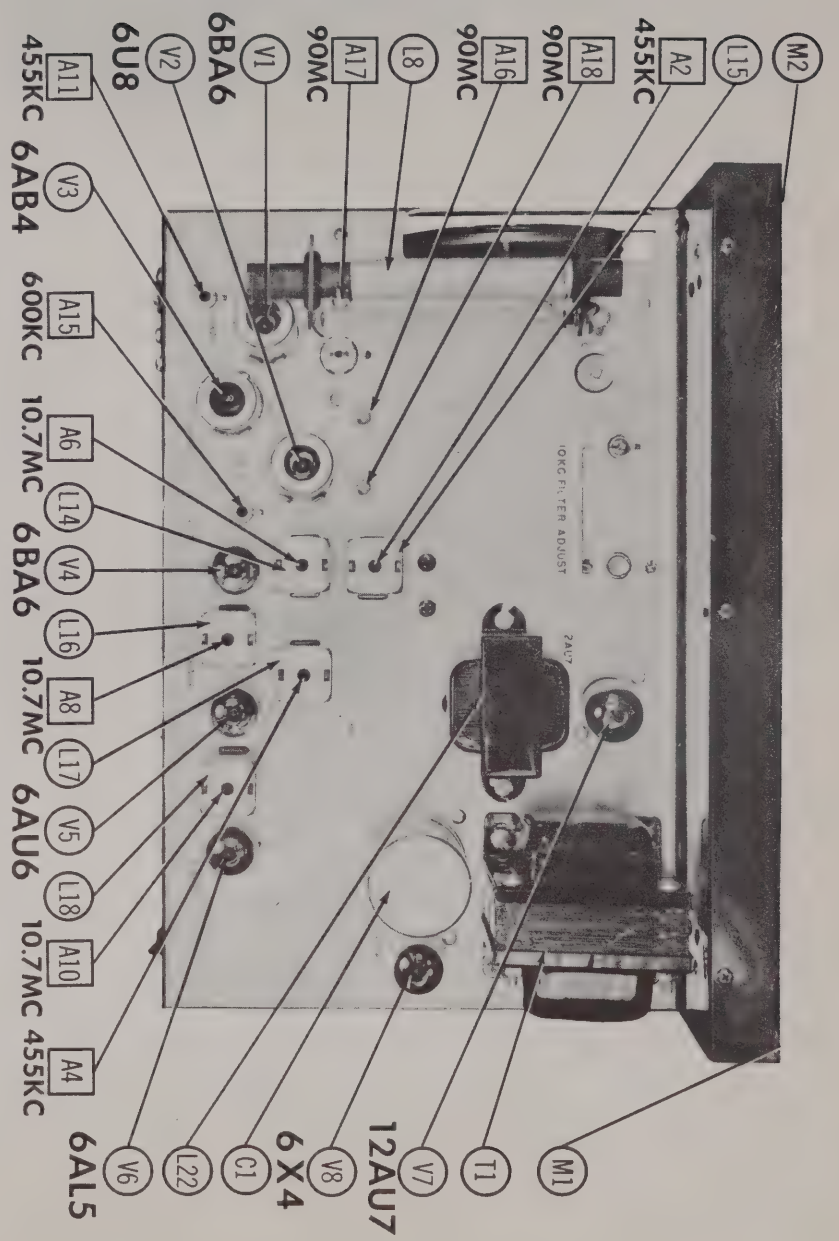
ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲ 40	300	24-123		C154	FP227. 5	TMD31	D-140	TVL-2582
B	■ 80	250				TC58	TD-80-350	FM-2540	TVA-1511
C	▲ 40	250							
C2	2	50	24-82	PRS50V2	BBR2-50	TC302	TD-2-50	MT-0502	TVA-1301

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	30	1000		HVD-15-33	DD-330	VQ33	1R5KV-330	MCL427	10GA-Q33	
C4	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C5	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C7	82			SI82	D6-820	G040	GP1K-820		5GA-Q82	
C8	50			NPO-SI50	TCZ-50	TZ23	NPO-338-500	ZT-545	5TCC-Q5	
C9	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C10	20			SI20	D6-200	TP22	GP1K-200	UC-542	5GA-Q2	
C11	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C12	20			SI20	D6-200	TP22	GP1K-200	UC-542	5GA-Q2	
C13	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C14	5			N750-SI5	TCN-5	N011	N750A-050	NT-555	5TCUB-V5	
C15	50			SI50	D6-500	TP47	GP1K-500	UC-545	5GA-Q5	
C16	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C17	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C18	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C19	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C20	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C21	10									
C22	30			N750-SI33	TCN-30	TN09	N750K-300		5TCU-Q33	
C23	100			NPO-SI100	TCZ-100	TZ30	NPO-337-101	ZT-531	5TCC-T1	
C24	3-12				822-FZ		557-3	ST-553-Z		
C25	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C26	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C27	33			SI33	D6-330	TP27	GP1K-330	UC-5433	5GA-Q33	
C28	.01	400		BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C29	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C30	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C31	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C32	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C33	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C34	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C35	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C36	2200			1464-0022		1R5D22			MS-222	
C37	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C38	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C39	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C40	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C41	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C42	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C43	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C44	.01	400		P488-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C45	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C46	.01	600		BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PILOT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	36-58	AB-70	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A.
R2A	10KΩ	½	39-38	B-14	A47-10K-S	Q11-116	U-20	10KC Filter Adjustment
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R2A.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PILOT PART No.	IRC PART No.	
R3	270KΩ			BTS-270K	
R4	270KΩ			BTS-270K	
R5	5600Ω			BTS-5600	
R6	470Ω			BTS-470	
R7	6800Ω			BTS-6800	
R8	22KΩ			BTS-22K	
R9	68Ω			BTS-68Ω	Note 1
R10	6800Ω			BTS-6800	
R11	1Meg			BTS-1Meg	
R12	1000Ω			BTS-1000	
R13	5600Ω			BTS-5600	
R14	1Meg			BTS-1Meg	
R15	68Ω			BTS-68	
R16	470KΩ			BTS-470K	
R17	27KΩ	1		BTA-27K	
R18	270Ω			BTS-270	
R19	270KΩ			BTS-270K	
R20	1000Ω			BTS-1000	
R21	5600Ω			BTS-5600	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PILOT PART No.	IRC PART No.	
R22	5600Ω			BTS-5600	
R23	39KΩ			BTS-39K	
R24	1Meg			BTS-1Meg	
R25	1000Ω			BTS-1000	
R26	5600Ω			BTS-5600	
R27	82KΩ			BTS-82K	
R28	27KΩ			BTS-27K	
R29	470KΩ			BTS-470K	
R30	39KΩ			BTS-39K	
R31	10KΩ 5%			BTS-10K 5%	
R32	10KΩ 5%			BTS-10K 5%	
R33	2200Ω			BTS-2200	
R34	39KΩ			BTS-39K	
R35	1500Ω	1		BTA-1500	
R36	470KΩ			BTS-470K	
R37	470Ω			BTS-470	
R38	10KΩ			BTS-10K	
R39	100Ω	2		BTB-100	
R40	2.7Ω	1			Note 1

Note 1. Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	PILOT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .26A	300VCT @ .043A	6.3VAC @ 3.05A		55-39				22R38 ①	

① Use universal mounting brackets.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	PILOT PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Coil	0Ω	0Ω	70-80				
L2	Cathode Choke	1Ω		75-33	19-1004		4529	5 Microhenries
L3	RF Coil	1Ω		75-33	19-1004		4529	5 Microhenries
L4	FM RF Coil	0Ω		71-40				
L5	Fil. Choke	.1Ω		75-19	19-1001		4604	1.6 Microhenries
L6	FM Osc. Coil	0Ω		72-76				
L7	Fil. Choke	.1Ω		75-19	19-1001		4604	1.6 Microhenries
L8	AM Ant. Coil	0Ω	0Ω	270-53				
L9	455KC Trap	30Ω		79-102				
L10	AM RF Coil	6.2Ω		71-41				Tapped @ 2Ω
L11	RF Coil	1Ω		75-33	19-1004		4529	5 Microhenries
L12	RF Coil	1Ω		75-33	19-1004		4529	5 Microhenries
L13	AM Osc. Coil	2.5Ω		72-55				Tapped @ .4Ω
L14	1st FM IF	.7Ω	.7Ω	273-151	16-3487	FM-254	1463	
L15	1st AM IF	8Ω	8Ω	273-129	16-6758	BC-352	12-C1	
L16	2nd FM IF	.7Ω	.7Ω	273-151	16-3487	FM-254	1463	
L17	2nd AM IF	8.5Ω	8.5Ω	273-129	16-6758	BC-353	12-C2	
L18	Ratio Det.	1.6Ω	.9ΩCT	279-72	17-3497	FM-255	1465	Tertiary Winding=.5Ω
L19	10KC Filter	320Ω		79-106				Tapped @ 145Ω
L20	Line Choke	.1Ω		75-19	19-1001		4604	1.6 Microhenries
L21	Line Choke	.1Ω		75-19	19-1001		4604	1.6 Microhenries

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	PILOT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L22	.043A	125Ω	3.2HY	57-16	C5005	C2977	C1080	20C59	C-4X

MISCELLANEOUS

ITEM No.	PART NAME	PILOT PART No.	NOTES
M1	Dial Light		#47
M2	Dial Light		#47
M3	Tuning Cap.	26-59	6 Gang (AM Sections: 30-495MMF, 30-495MMF, 21-165MMF)
M4	Switch	100-100	Selector (Rotary-Wafer Type)
M5	Switch	101-38	Selector (3 Pole - 3 Position, Slide Type) Mechanically Ganged to M4

PHOTOFACT* Folder

RCA VICTOR MODELS 21-S-632, U, 21-S-6052, U, 21-S-6053, U, 21-S-6057, U (Ch. KCS95, A, B, C)

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RCA VICTOR MODEL 21-S-6052

TRADE NAME	RCA Victor	MODELS	CHASSIS	TUNER
		21-S-6052, 21-S-6053, 21-S-6057	KCS-95	KRK32B
		21-S-632	KCS-95A	KRK32B
		21-S-6052U, 21-S-6053U, 21-S-6057U	KCS-95B	KRK33B
		21-S-632U	KCS-95C	KRK33C
MANUFACTURER	Radio Corporation of America, RCA Victor Television Div., Camden, N.J.			
TYPE SET	Television Receiver			
TUBES	Sixteen			
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.32 Amp. @ 117 Volts AC		
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)			

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RCA VICTOR MODELS 21-S-632, U, 21-S-6052, U, 21-S-6053, U, 21-S-6057, U (Ch. KCS95, A, B, C)

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RCA VICTOR MODELS 21-S-632, U, 21-S-6052, U, 21-S-6053, U, 21-S-6057, U (Ch. KCS95, A, B, C)

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from top panel of cabinet. (Also, remove 2 metal screws holding plastic guard).

2. Remove 5 clip spring fasteners from rear cover. Remove rear cover.

3. Remove picture tube socket, ion trap and centering magnet.

4. Disconnect speaker leads.

5. Remove 1 metal screw holding brace on tuner.

6. Remove 2 chassis bolts from bottom of cabinet and 2 hex nuts at the top holding chassis in cabinet.

7. Pull chassis part way out and remove HV lead, then remove chassis the rest of the way.

8. Remove 4 speaker nuts. Remove speaker.

MODELS	CHASSIS
21-S-6052, 21-S-6053, 21-S-6057	KCS-95
21-S-632	KCS-95A
21-S-6052U, 21-S-6053U, 21-S-6057U ..	KCS-95B
21-S-632U.....	KCS-95C

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 5 metal screws holding a "U" shaped channel under the front top edge of the cabinet. Remove channel and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 3.

SPECIAL ADJUSTMENTS

A. AGC Control Adjustment (Used in VHF-UHF Models Only

If receiver overloads on a strong signal, adjust the AGC control until picture shows no sign of overloading or unstable sync. The normal setting of the AGC control is at its mid-range position.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The horizontal frequency coil (L54) is located on the control panel of the chassis and is used as the horizontal hold control. Adjust horizontal hold until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (A49) located on top of chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

RCA VICTOR MODELS 21-S-632, U, 21-S-6052, U, 21-S-6053, U, 21-S-6057, U (Ch. KCS95, A, B, C)

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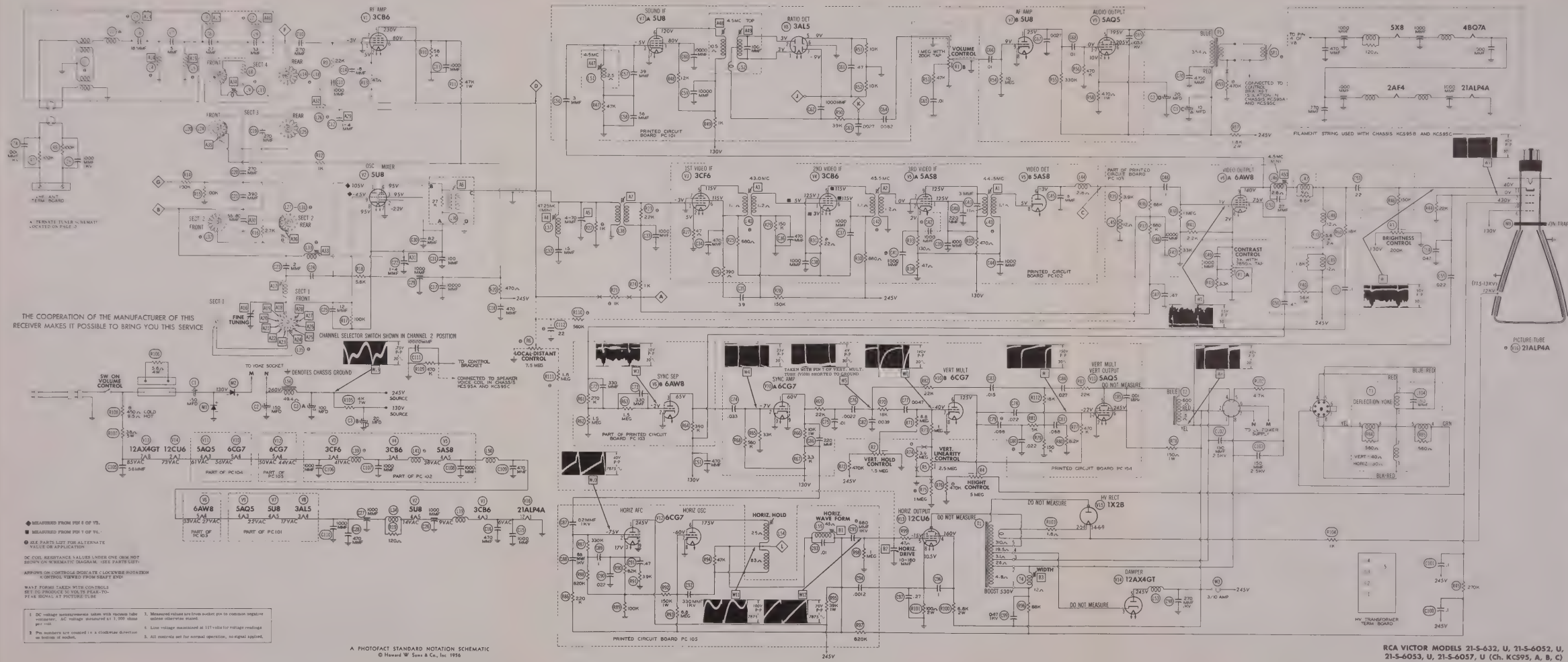
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1956
RCA VICTOR MODELS 21-S-632, U, 21-S-6052, U, 21-S-6053, U, 21-S-6057, U (Ch. KCS95, A, B, C)

RCA VICTOR MODELS 21-S-632, U, 21-S-6052, U, 21-S-6053, U, 21-S-6057, U (Ch. KCS95, A, B, C)

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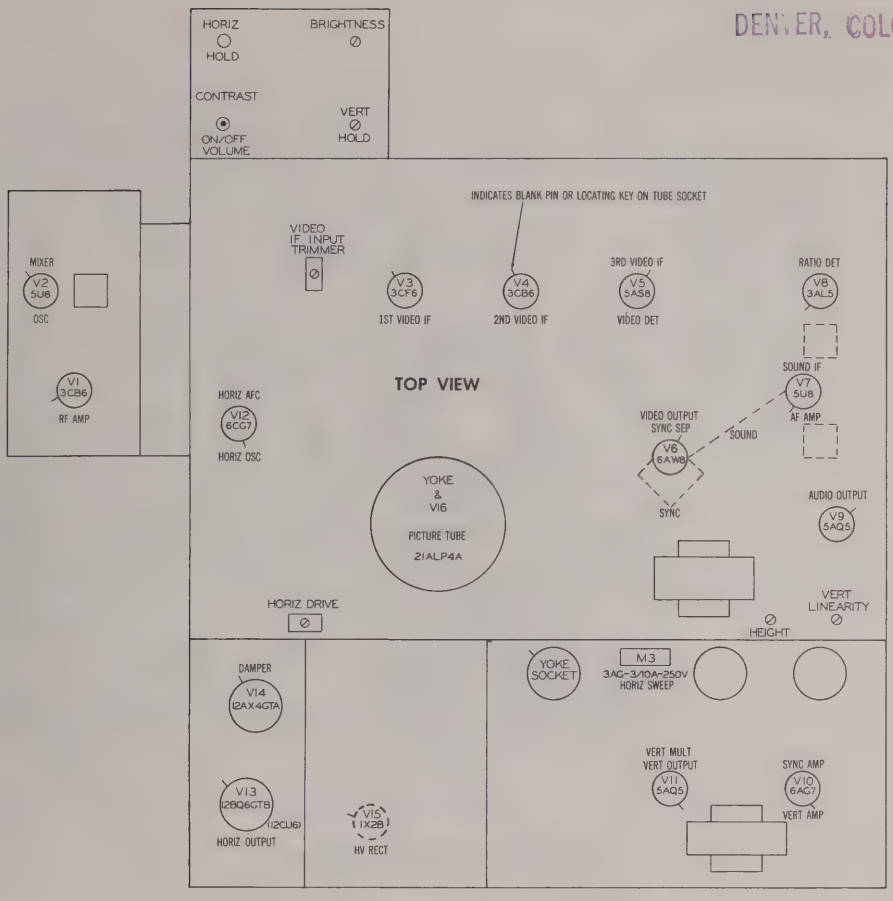
[illegible] MEADE ST.
DENVER, COLORADO

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

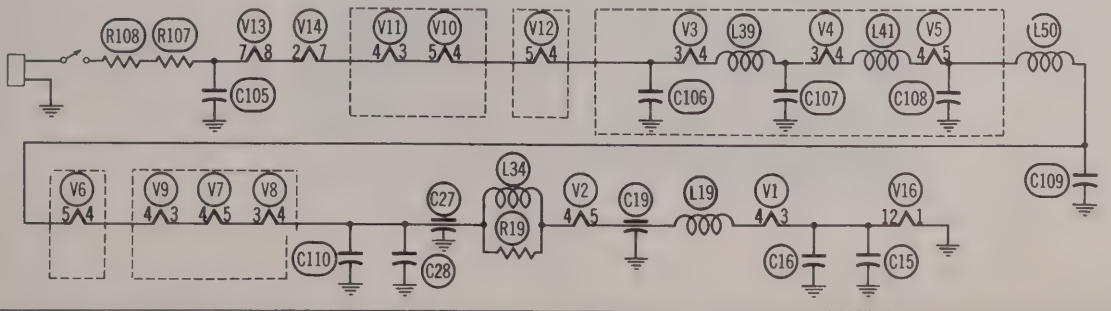
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V16**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V10, V11**
No horiz. sync - **V10, V12**
No vert. or horiz. sync - **V6, V10**

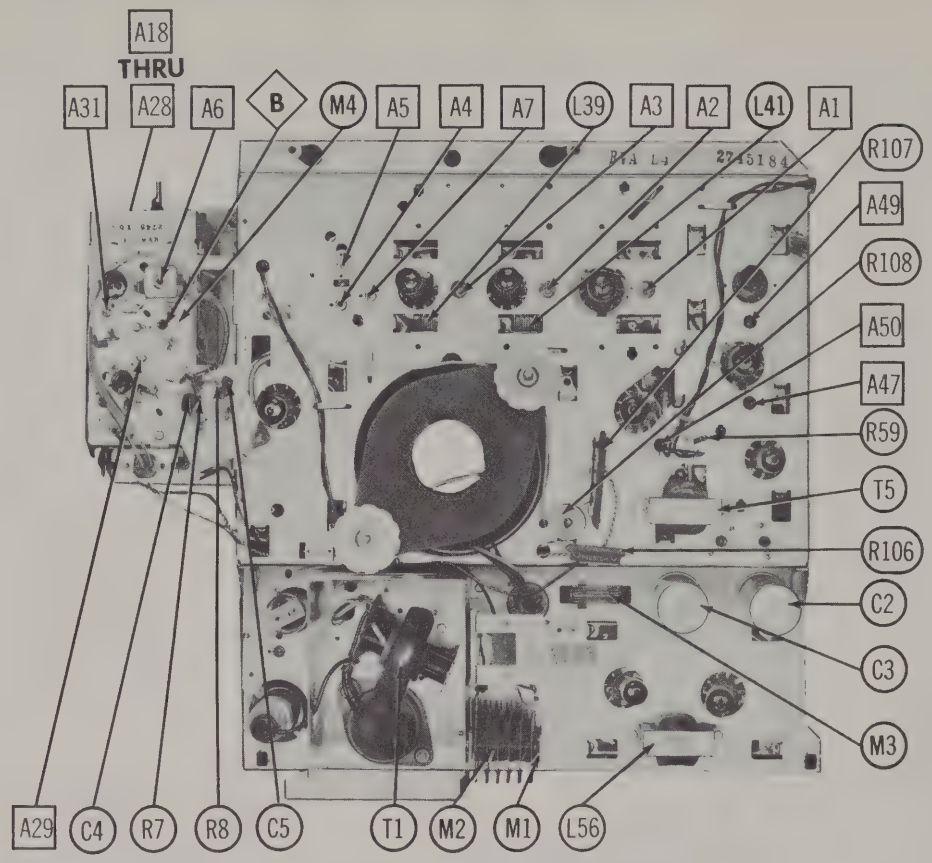
SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16, Fuse (M1)**
No vertical deflection - **V10, V11**
Poor vert. linearity or foldover - **V10, V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, M1, M2**
Vert. off freq. - **V10, V11**
Horiz. off freq. - **V10, V12**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative (See circuit below).

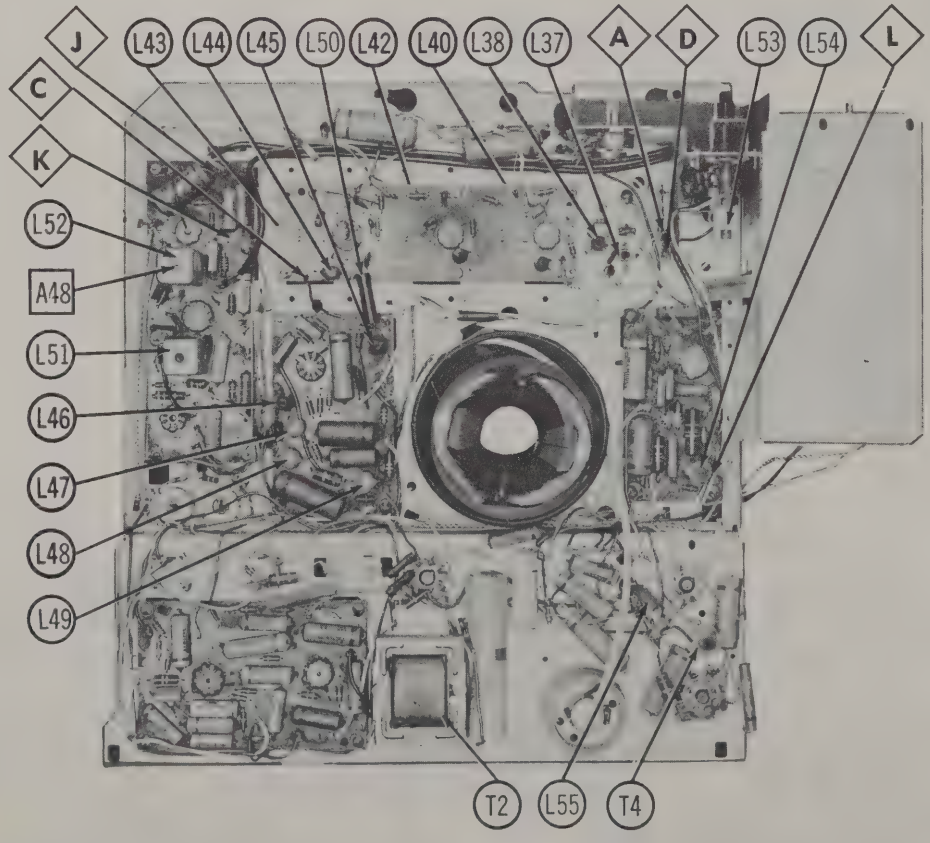


SET 322 FOLDER 11

RCA VICTOR MODELS 21-S-632, U, 21-S-6052, U, 21-S-6053, U, 21-S-6057, U (Ch. KCS95, A, B, C)



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

ALIGNMENT INSTRUCTIONS (cont)

KRK33B, KRK33C TUNER UNIT UHF ALIGNMENT

Turn the change over switch to UHF position.
To make the RF adjustments for UHF tuner, the UHF tuner unit will have to be removed from the set. IF and oscillator adjustments may be aligned without removing UHF tuner.
It will be necessary to fabricate a test dial to fit over the split gear on the tuner shaft for accurate alignment.
Reference marks at 0°, 5° and 164° should be scribed on the test dial. Locate "0" degree reference point by placing a 1/16" shim between the stop pin on the tuner and the stop plate on the gear assembly with the capacitor plates fully meshed.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
44.	300Ω pad (Fig. 5)	Across UHF antenna terminals thru 300Ω pad (Fig. 5).	887.5MC (20MC Swp)	887.5MC 41.25MC 43.5MC 45.75MC	83 (Rotate dial to 164°)	Vert. Amp. to point (H). Low side to chassis.	A41, A42, A43	Connect the high side of VHF generator thru a 1000Ω carbon resistor to rear terminal of IN82 crystal holder and insert markers for 41.25MC, 43.5MC and 45.75 MC. Adjust for response similar to Fig. 8. Adjust A41 and A42 for maximum over-coupled response curve centered at 887.5 MC. Adjust A43 until the 43.5MC marker coincides with the 887.5MC marker.
45.	"	"	473.5MC (20MC Swp)	473.5MC 41.25MC 43.5MC 45.75MC	14 (Rotate dial to 5°)	"	A44, A45	Adjust A44 until 43.5MC marker coincides with 473.5MC marker and with the 41.25 MC marker and 45.75MC marker as shown in Fig. 9. Adjust A45 to bring the oscillator trimmer adjustment A44 within range.

46. Repeat steps 44 and 45 until response curves as in Fig. 8 and Fig. 9 are obtained. With perfect tracking the three markers will ride on top of the response curve. They may ride down the curve as far as 70% without seriously affecting alignment. If they fall below 70% level, knifing of the RF plates is necessary to correct tracking. It is necessary to remove shield cover to knife RF plates. Always knife the plates while tuning in the lower frequency to avoid affecting the tracking above the point of knifing. A check of which section to knife may be made by touching the plates with the knifing tool while observing the response.

47. Connect the DC probe of a VTVM to point (H). Common to chassis. Set VTVM to 1.5 volts on DC scale. Tune over entire UHF range. Readings between .03 and .35 volts should be obtained. Voltages outside these limits are an indication low B+ voltage, low or high crystal impedance or an oscillator tube operating outside its allowable limits. Connect the DC probe of VTVM to point (I), which is tuner bias terminal. Common to chassis. VTVM should read .5 and 2.5 volts. Readings outside of these limits will cause crystal currents outside allowable limits and in such cases replacement of the oscillator tube should follow. If the oscillator tube is replaced, recalibration of the high and low frequency end of the bands is required as outlined above.

FM TRAP ADJUSTMENT

Tune in a local TV station in which interference is noticed. Adjust A46 for minimum interference in picture.

SOUND IF ALIGNMENT

Ground pin 2 (grid) of 3rd video IF amplifier tube (V5A) to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
48.	.01MFD	High side to pin 7 (grid) of video output tube (V6A). Low side to chassis.	4.5MC (Unmod)	Any unused channel	DC probe to point (J). Common to chassis.	A49	Adjust for maximum deflection. Peak with core at chassis end.
49.	"	"	"	"	"	A47, A48	Adjust for maximum deflection. Peak A48 with core at end of coil away from chassis.
50.	"	"	"	"	"	A49	Adjust for zero reading. A positive and negative reading will be obtained on either side of correct setting. Remove ground from pin 2 of V5A.

4.5MC TRAP ALIGNMENT

Ground pin 2 (grid) of 3rd video IF amplifier tube (V5A) to chassis when properly adjusted, core will be away from chassis end of coil.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
51.	.01MFD	High side to pin 7 (grid) of video output tube (V6A). Low side to chassis.	4.5MC (Unmod)	Any unused chassis.	DC probe thru detector (Fig. 1) to pin 11 (cathode) of picture tube. Common to chassis.	A50	Increase output for .5 volts on VTVM. Adjust for MINIMUM deflection. Remove ground from pin 2 of V5A. Tune in a TV station. Set contrast and brightness control for a normal picture. Rotate the fine tuning control over its range. If 4.5MC beat is noted in picture, retouch A50 for MINIMUM 4.5MC beat.

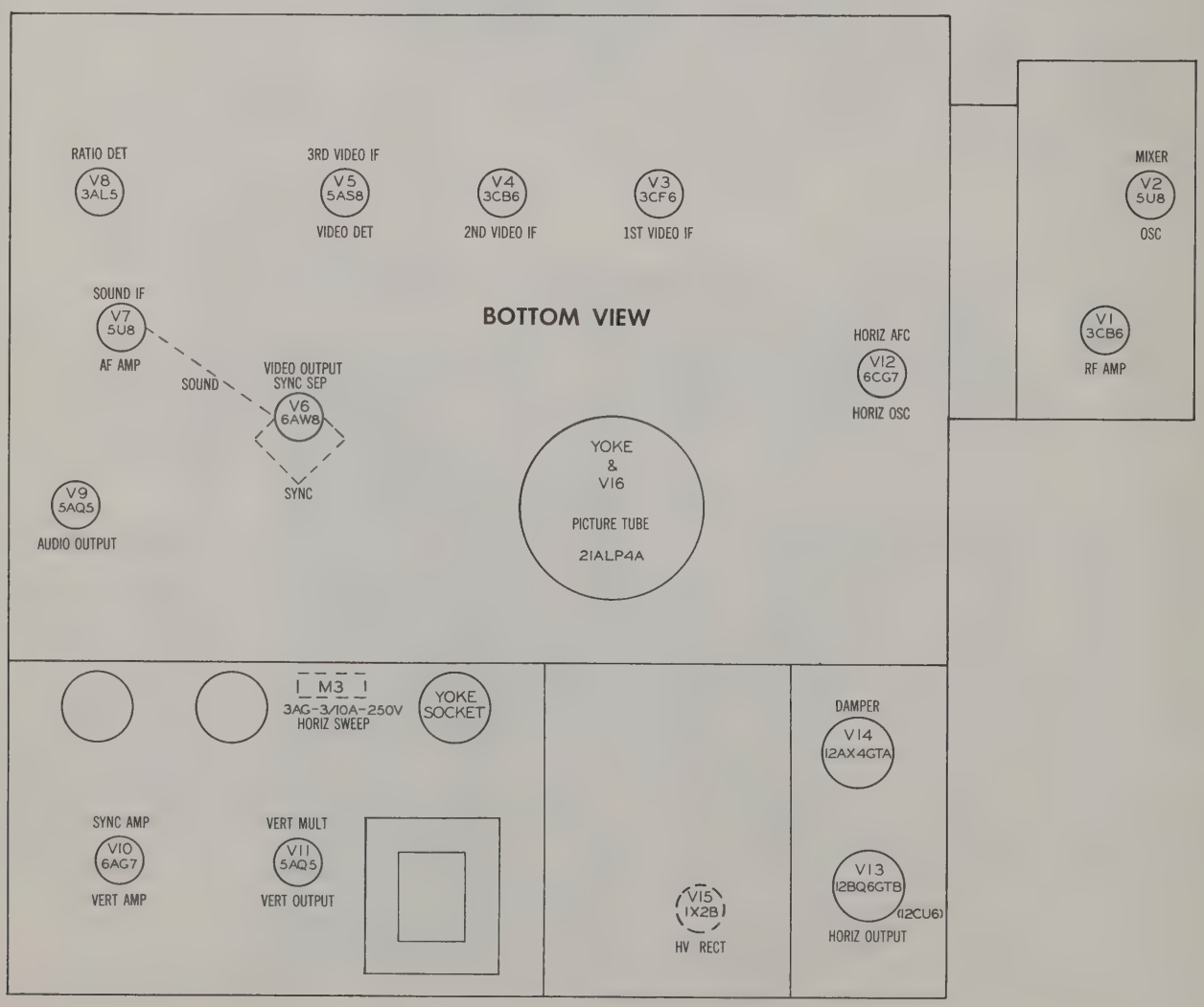
TELEVISION CHANNEL FREQUENCIES

Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier
2	54-60	55.25	59.75	23	524-530	525.25	529.75	44	650-656	651.25	655.75	64	770-776	771.25	775.75
3	60-66	61.25	65.75	24	530-536	531.25	535.75	45	656-662	657.25	661.75	65	776-782	777.25	781.75
4	66-72	67.25	71.75	25	536-542	537.25	541.75	46	662-668	663.25	667.75	66	782-788	783.25	787.75
5	76-82	77.25	81.75	26	542-548	543.25	547.75	47	668-674	669.25	673.75	67	788-794	789.25	793.75
6	82-88	83.25	87.75	27	548-554	549.25	553.75	48	674-680	675.25	679.75	68	794-800	795.25	799.75
7	174-180	175.25	179.75	28	554-560	555.25	559.75	49	680-686	681.25	685.75	69	800-806	801.25	805.75
8	180-186	181.25	185.75	29	560-566	561.25	565.75	50	686-692	687.25	691.75	70	806-812	807.25	811.75
9	186-192	187.25	191.75	30	566-572	567.25	571.75	51	692-698	693.25	697.75	71	812-818	813.25	817.75
10	192-198	193.25	197.75	31	572-578	573.25	577.75	52	698-704	699.25	703.75	72	818-824	819.25	823.75
11	198-204	199.25	203.75	32	578-584	579.25	583.75	53	704-710	705.25	709.75	73	824-830	825.25	829.75
12	204-210	205.25	209.75	33	584-590	585.25	598.75	54	710-716	711.25	715.75	74	830-836	831.25	835.75
13	210-216	211.25	215.75	34	590-596	591.25	595.75	55	716-722	717.25	721.75	75	836-842	837.25	841.75
14	470-476	471.25	475.75	35	596-602	597.25	601.75	56	722-728	723.25	727.75	76	842-848	843.25	847.75
15	476-482	477.25	481.75	36	602-608	603.25	607.75	57	728-734	729.25	733.75	77	848-854	849.25	853.75
16	482-488	483.25	487.75	37	608-614	609.25	613.75	58	734-740	735.25	739.75	78	854-860	855.25	859.75
17	488-494	489.25	493.75	38	614-620	615.25	619.75	59	740-746	741.25	745.75	79	860-866	861.25	865.75
18	494-500	495.25	499.75	39	620-626	621.25	625.75	60	746-752	747.25	751.75	80	866-872	867.25	871.75
19	500-506	501.25	505.75	40	626-632	627.25	631.75	61	752-758	753.25	757.75	81	872-878	873.25	877.75
20	506-512	507.25	511.75	41	632-638	633.25	637.75	62	758-764	759.25	763.75	82	878-884	879.25	883.75
21	512-518	513.25	517.75	42	638-644	639.25	643.75	63	764-770	765.25	769.75	83	884-890	885.25	889.75
22	518-524	519.25	523.75	43	644-650	645.25	649.75								

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	3CB6	800KΩ	47Ω	3Ω	4Ω	† 1. 6KΩ	† 30KΩ	0Ω		
V 2	5U8	† 6. 1KΩ	100KΩ	INF	5Ω	4Ω	INF	0Ω	INF	INF
V 3	3CF6	750KΩ	47Ω	14Ω	13Ω	▲ 680Ω	▲ 680Ω	0Ω		
V 4	3CB6	90KΩ	▲ 22Ω	13Ω	12Ω	† 730Ω	† 730Ω	INF		
V 5	5AS8	† 4. 5KΩ	1. 2Ω	180Ω	12Ω	10Ω	3. 9KΩ	0Ω	47Ω	† 4. 5KΩ
V 6	6AW8	0Ω	3Meg	† 390KΩ	9Ω	10Ω	120Ω	1Meg	† 56KΩ	† 5. 6KΩ
V 7	5U8	† 330KΩ	47KΩ	† 17KΩ	8Ω	6Ω	† 5KΩ	0Ω	0Ω	10Meg
V 8	3AL5	INF	INF	6Ω	5Ω	10KΩ	0Ω	10KΩ		
V 9	5AQ5	470KΩ	470Ω	8Ω	9Ω	† 2. 2KΩ	† 1. 8KΩ	470KΩ		
V 10	6CG7	† 17KΩ	33KΩ	0Ω	15Ω	16Ω	▲ 1. 6Meg	2. 5Meg	0Ω	0Ω
V 11	5AQ5	2. 5Meg	0Ω	16Ω	19Ω	† 650Ω	† 200Ω	2. 5Meg		
V 12	6CG7	† 50Ω	1. 3Meg	180KΩ	14Ω	15Ω	† 40KΩ	250KΩ	0Ω	0Ω
V 13	12BQ6GTB/ 12CU6	NC	22Ω	NC	† 6. 8KΩ	1Meg	TP	19Ω	100Ω	TOP CAP ▲ 19. 5Ω
V 14	12AX4GTA	NC	NC	900KΩ	NC	† 55Ω	NC	24Ω	22Ω	
V 15	1X2B		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 330Ω
V 16	21ALP4A	0Ω	22KΩ	PIN 6 † 4KΩ	PIN 10 ▲ 350KΩ	PIN 11 † 200KΩ	PIN 12 3Ω			

† MEASURED FROM OUTPUT OF M2
▲ MEASURED FROM PIN 7 OF V4.
▲ MEASURED FROM PIN 3 OF V14.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
M3 (Fuse) may be removed to prevent shock hazard during alignment. If not removed, the high voltage lead should be taped securely and kept away from the chassis.

VIDEO IF ALIGNMENT USING TUNER KRK32B

Connect the ends of a 1000Ω potentiometer across a 7.5 volt battery capable of withstanding considerable current drain. Connect the negative terminal arm to point Ⓐ. Set potentiometer arm to obtain -3.5 volts at point Ⓐ. Connect the positive terminal to chassis. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.0015MFD	High side to point Ⓑ. Low side to chassis.	Not used	44.5MC	Any unused channel	USE VTVM. DC probe to point Ⓒ. Common to chassis.	A1	Attenuate generator output to maintain not more than -3 volts on VTVM. Adjust for maximum deflection.
2.	"	"	"	45.5MC	"	"	A2	"
3.	"	"	"	43.0MC	"	"	A3	"
4.	"	"	"	47.25MC	"	"	A4	Increase generator output to maintain -3 volts on VTVM. Adjust for MINIMUM deflection.
5.	"	High side to point Ⓑ. Low side to tuner chassis.	44MC (10MC Swp)	42.5MC 45.75MC	4	Vert. Amp. of scope thru detector (Fig.1) to pin 5 (plate) of 1st. Video IF Amp. tube (V3). Low side to chassis.	A5, A6, A7	Adjust bias to read -3.5 volts at point Ⓐ. Clip a carbon 330Ω resistor from pin 2 (grid) of 3rd. video IF amplifier (V5A) to chassis. Connect a 180Ω carbon resistor from plate to screen (pins 5 and 6) of 1st. video IF amplifier tube (V3). Preset A5 (trimmer) to minimum capacity. If a separate signal generator is used for marker couple it loosely to detector as in Fig. 1. Attenuate output of sweep generator to give 0.5 volts peak to peak on scope. Adjust A6 and A7 for maximum gain with 45.75MC marker at 75% of maximum response as in Fig. 2. Adjust A5 to place 42.5MC marker at 70% response on curve as in Fig. 2. Disconnect the 180Ω and 330Ω resistors. Remove scope and detector from pin 5 of V3.
6.	"	"	"	42.5MC 45.0MC 45.75MC	4	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A2, A3	Attenuate output of sweep generator to obtain 3 to 5 volts peak to peak on scope. If a separate signal generator is used for a marker, couple it loosely to pin 1 (grid) of 1st. video IF amplifier tube (V3). Retouch A1, A2 and A3 if necessary to obtain response curve similar to Fig. 3.
7.	"	"	"	41.25MC	"	"	A1, A3	Increase sweep generator output ten times and notice attenuation at 41.25MC. Adjust A1 and A3 to set 41.25MC marker at approximately 30 times down with response curve as shown in Fig. 3.
8.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	"	42.5MC 45.0MC 45.75MC	All VHF channels separately	"	A1, A2	Slightly readjust A1 and A2 to correct any overall tilt while switching from channel to channel as in Fig. 3. Couple marker generator loosely to first video IF Amp. tube grid. Continue alignment with step 13.

VIDEO IF ALIGNMENT USING TUNER UNIT KRK33B, KRK33C

Same instructions as under "Video IF Alignment Using Tuner KRK32B"

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.0015MFD Ceramic Capacitor	High side to point Ⓑ. Low side to chassis.	Not used	44.5MC	Any unused channel	USE VTVM. DC probe to point Ⓒ. Common to chassis.	A1	Attenuate generator output to maintain not more than -3 volts on VTVM. Adjust for maximum deflection.
2.	"	"	"	45.5MC	"	"	A2	"
3.	"	"	"	43.0MC	"	"	A3	"
4.	"	"	"	47.25MC	"	"	A4	Increase generator output to maintain -3 volts on VTVM. Adjust for MINIMUM deflection.
5.	"	High side to point Ⓑ. Low side to tuner chassis.	44MC (10MC Swp)	42.5MC 45.75MC	4	Vert. Amp. of scope thru detector (Fig.1) to pin 5 (plate) of 1st. video IF amp. tube (V3). Low side to chassis.	A5, A6, A7	Adjust bias to read -3.5 volts at point Ⓐ. Clip a carbon 330Ω resistor from pin 2 (grid) of 3rd. video IF amp. tube (V5A) to chassis. Connect a 180Ω carbon resistor from plate to screen (pins 5 and 6) of 1st. video IF amp. tube (V3). Preset A5 (trimmer) to minimum capacity. If a separate signal generator is used for marker couple it loosely to detector as in Fig. 1. Attenuate output of sweep generator to give 0.5 volts peak to peak on scope. Adjust A6 and A7 for maximum gain with 45.75MC marker at 75% of maximum response as in Fig. 2. Adjust A5 to place 42.5MC marker at 70% response on curve as in Fig. 2. Disconnect the 180Ω and 330Ω resistors. Remove scope and detector from pin 5 of V3.
6.	"	"	"	42.5MC 45.0MC 45.75MC	4	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A2, A3	Attenuate output of sweep generator to obtain 3 to 5 volts peak to peak on scope. If a separate signal generator is used for a marker, couple it loosely to pin 1 (grid) of 1st. video IF amp. tube (V3). Retouch A1, A2 and A3 if necessary to obtain response curve similar to Fig. 3.

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ALIGNMENT INSTRUCTIONS (cont)

VIDEO IF ALIGNMENT USING KRK33B, KRK33C TUNER UNIT (CONT)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.0015MFD	High side to point Ⓐ. Low side to chassis.	44MC (10MC Swp)	41.38MC	4	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A3	Increase sweep generator output ten times and notice attenuation at 41.75MC. Adjust A1 and A3 to set 41.25MC marker at approximately 30 times down with response curve as shown in Fig. 3.
8.	Two 130Ω Carbon Resistors	Across VHF antenna terminals with 130Ω in each lead.	"	42.5MC 45.0MC 45.75MC	All VHF channels separately	"	A1, A2	SLIGHTLY readjust A1 and A3 to correct any overall tilt while switching from VHF channel to VHF channel (Fig. 3).
9.	.10000Ω Carbon Resistor in series with .0015MFD ceramic capacitor	High side to front terminal of 1N82 crystal holder. Low side to tuner case. Use very short leads.	79?MC (20MC Swp)	45.75MC 42.5MC	Between channels 6S and 6S.	Vert. Amp. thru detector (Fig. 1) to junction of 220Ω and .0015MFD (see remarks). Low side to chassis.	A8, A9	Set tuner to UHF position. Connect a 330Ω in series with a .0015MFD capacitor (ceramic) between pin 1 (plate) of 6BQ7A and chassis with the capacitor and connected to pin 1 of 6BQ7A and resistor end to chassis. If VHF generator is used as a marker, couple it loosely to detector (Fig. 1). Connect a second bias supply to point Ⓓ. Positive side to tuner case. Adjust for -3 volts at point Ⓓ. Alternate sweep generator for 0.5 volts peak to peak on scope. Adjust A8 and A9 for maximum gain as in Fig. 4.
10.	"	"	"	"	"	Vert. Amp. thru detector (Fig. 1) to point Ⓒ. Low side to chassis.	A10, A11	Tuner in UHF position. Loosely couple marker generator to detector (Fig. 1). If necessary, adjust A10 and A11 to place 45.75MC marker at peak of curve with MINIMUM tilt. Remove 220Ω resistor and .0015MFD capacitor from pin 1 of 6BQ7A tube. Remove detector and scope from point Ⓒ.
11.	Two 130Ω Carbon Resistors	Across antenna (VHF) terminals with 130Ω in each lead.	44MC (10MC Swp)	42.5MC 45.0MC 45.75MC 46.5MC	Check all VHF channels	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A3	Couple marker generator loosely to first video IF amplifier grid. Check for response curve similar to Fig. 3 on all VHF channels SLIGHTLY retouch A1 and A3 if necessary to correct for any overall tilt as in step 8.
12.	300Ω pad (Fig. 5)	Across UHF antenna terminals thru 300Ω pad (Fig. 5).	See freq. chart of all UHF channels	"	Check all UHF channels	"	A10, A11	Couple marker generator loosely to first video IF amplifier grid. Check for response curve similar to Fig. 3 on all UHF channels. If necessary, SLIGHTLY retouch A10 and A11 to correct for any overall tilt. Do not retouch A1, A2, A3, A6, A7, A8 or A9 in this step. Remove all test equipment. Disconnect both bias supplies.

KRK32B, KRK33B, KRK33C ANTENNA MATCHING UNIT ALIGNMENT

The antenna matching unit has been properly aligned at the factory. The RF unit is aligned with a particular antenna matching unit in place. If a new antenna unit is installed, the RF unit should be realigned. Alignment should not be attempted without the proper alignment facilities. The FM trap adjustment (A46) which is located on the antenna matching unit may be adjusted without seriously affecting the RF alignment. Disconnect the lead from the FM trap (L7), in the channel selector switch. Use a short jumper to connect point Ⓨ on the matching unit through a .001MFD capacitor to pin 1 (grid) of second video IF amplifier tube (V4). Remove the first video IF amplifier tube (V3) from its socket. Cover of the matching unit must be in place during alignment. Connect the negative terminal of potentiometer arm of bias supply to point Ⓐ. Positive terminal to chassis. Set the potentiometer arm to obtain -5 volts at point Ⓧ on VTVM. Note: Adjustments A12 thru A16 are adjusted by expanding or compressing coil turns, except in antenna matching units in which C6, C7 and C8 are variable capacitors. C6 would be adjustment A13. C7 would be adjustment for A14 and A15. C8 would be adjustment A12. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13. Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	Not used	45.75MC (400%Mod)	Any	Vert. Amp. to point Ⓒ. Low side to chassis.	A12	Set scope gain to maximum and adjust for MINIMUM 400% indication on scope.
14. "	"	"	41.25MC (400%Mod)	"	"	A13	"
15. 300Ω Pad (Fig. 5)	Across antenna terminals thru 300Ω pad (Fig. 5).	60MC (30MC Swp)	60MC 53MC 53MC 60MC	"	Vert. Amp. thru detector probe (Fig. 1) to point Ⓒ. Low side to chassis.	A14, A15	Remove the .001MFD capacitor from point Ⓨ to pin 1 of V4. Connect a 300Ω, ½ watt carbon resistor from point Ⓨ to chassis. Adjust A14 and A15 to obtain response curve similar to Fig. 6. Repeat steps 13, 14 and 15 until no further improvement is noted. Remove the 300Ω resistor and the detector probe between point Ⓨ and chassis. Replace V3 in its socket.

KRK32B TUNER ALIGNMENT

An RF unit which is operative and requires only minor touch up adjustments will require no presetting of adjustments. This unit is properly aligned at the factory and under normal use should not require alignment unless components are changed to effect alignment.
When complete alignment is necessary make the following pre - adjustments.
1. Turn A6 so that slug is all the way out.
2. Preset A16 all the way out.
3. Set channel 7 thru 13 slugs one turn from tight.
4. Disconnect the link from terminals of converter plate transformer (L36) and shunt the terminals of L36 with a 39Ω carbon resistor.

Tuner alignment as outlined below requires the use of a heterodyne frequency meter. The limits of oscillator injection voltage are 2 volts minimum and 5.5 volts maximum measured at point Ⓖ with a VTVM. Connect negative terminal of potentiometer arm of one of the bias supplies to point Ⓓ. Positive side to tuner chassis. Adjust for -3.5 volts bias at point Ⓓ. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16. Direct	RF input of heterodyne freq. meter to end of insulated wire inserted in hole provided for adjustment of A30. Be careful that the wire does not touch any of the tuned circuits as this may cause oscillator shift.	Not used	Set freq. meter to 227MC	8	Not used	A16	Turn fine tuning control to its mid-range position. Adjust A16 for audible beat on frequency meter.
17.	If channel 8 oscillator frequency cannot be reached by adjustment of A16, switch to channel 13 and adjust A17 for channel 13 oscillator frequency. Switch to channel 12 and adjust A18 for channel 12 oscillator frequency. Continue to channel 8. Adjust proper oscillator trimmer to obtain oscillator frequency on each channel. Also on channel 8 adjust A16 for channel 8 oscillator frequency. Switch to channel 13 and adjust A17, then back to channel 8 and again adjust A16.						

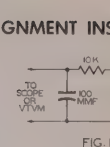


FIG. 1

FIG. 2

FIG. 3

FIG. 4

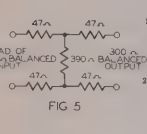


FIG 5

FIG-6

FIG. 7

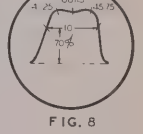


FIG. 8

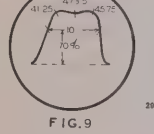


FIG. 9

KRK32B TUNER ALIGNMENT (CONT.)

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
18. Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert Amp to point Ⓒ Low side to chassis	A29, A30, A31	Set scope to maximum gain for usable indication on scope. Adjust A29, A30 and A31 for response curve similar to Fig. 4. A29 affects bandpass. A31 affects the tilt. A30 affects the overall response bandwidth.
19.	Connect frequency meter as in step 16.	Not used	Freq. meter to 257MC	13	Not used	A17	Turn fine tuning control to its mid-range position. Adjust A17 for audible beat. Turn A17 an additional turn in the same direction and readjust A16 to again obtain an audible beat.
20. Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	"	Vert. Amp. to point Ⓒ Low side to chassis	A32, A33	Adjust for proper response as shown in Fig. 4.
21.	Connect the DC probe of a VTVM to point Ⓒ. Common to chassis. Check oscillator injection voltage. Check oscillator tracking on channels 8 thru 13 if voltage is not within limits. Check V2 by replacing 5U8 tube. If voltage is still off, replace oscillator coupling capacitor (C33). If either is replaced, repeat oscillator tracking procedure for channels 8 thru 13.						
22.	Connect frequency meter as in step 16.	Not used	Freq. meter to 227MC	8	Not used	A16	Check for audible beat on frequency meter if necessary, adjust A16 for proper frequency.
23. Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead	88?MC (10MC Swp)	181.25MC 185.75MC	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A29, A30, A31	If necessary retouch A29, A30 and A31 to obtain response as in Fig. 4. If A31 required adjustment, turn off generator and switch back to channel 13 and check oscillator injection voltage as in step 21. If necessary repeat steps 20, 21 and 22 until proper response is obtained.
24.	Connect frequency meter as in step 16.	Not used	Freq. meter to 129MC	8	Not used	A34	Set fine tuning control to its mid-range position. Adjust A34 for audible beat on frequency meter.
25. Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A34, A35, A36	Adjust for response curve similar to Fig. 7. Check oscillator injection as in step 24. A34 affects maximum amplitude of curve midway between markers. A35 affects freq. bandpass. A36 affects tilt (providing A34 has been properly adjusted).
26. " "		85MC (10MC Swp)	83.25MC 87.75MC	"	"		Check for response similar to Fig. 7. Check oscillator injection voltages for each channel at point Ⓖ. If markers fall below 80% on any one channel, retouch A34, A35 and A36 to obtain response curves within proper limits.
		79MC (10MC Swp)	77.25MC 81.75MC	6			
		69MC (10MC Swp)	67.25MC 71.75MC	4			
		63MC (10MC Swp)	61.25MC 65.75MC	3			
		57MC (10MC Swp)	55.25MC 59.75MC	2			
27. " "		213MC (10MC Swp)	211.25MC 215.75MC	13			Check for response similar to Fig. 7. Check oscillator injection voltages for each channel at point Ⓖ. If markers fall below 80% on any one channel, retouch A29, A30 and A31 to obtain response curves within proper limits.
		207MC (10MC Swp)	205.25MC 209.75MC	12			
		201MC (10MC Swp)	199.25MC 203.75MC	11			
		195MC (10MC Swp)	193.25MC 197.75MC	10			
		189MC (10MC Swp)	187.25MC 191.75MC	9			
		183MC (10MC Swp)	181.25MC 185.75MC	8			
		177MC (10MC Swp)	175.25MC 179.75MC	7			
28.	Connect frequency meter as in step 16.	Not used	Freq meter to 257MC	13	Not used	A17	Adjust individual channel oscillator slug for audible beat on each channel. Recheck oscillator injection voltage on each channel at point Ⓖ to verify that the voltages are within limits, 2 volts MINIMUM and 5.5 volts maximum.
			253MC	12		A18	
			249MC	11		A19	
			239MC	10		A20	
			233MC	9		A21	
			227MC	8		A22	
			221MC	7		A23	
			129MC	6		A24	
			123MC	5		A25	
			113MC	4		A26	
			107MC	3		A27	
			101MC	2		A28	

KRK33B, KRK33C TUNER UNIT VHF ALIGNMENT

Same instructions as under "KRK32B Tuner Alignment"

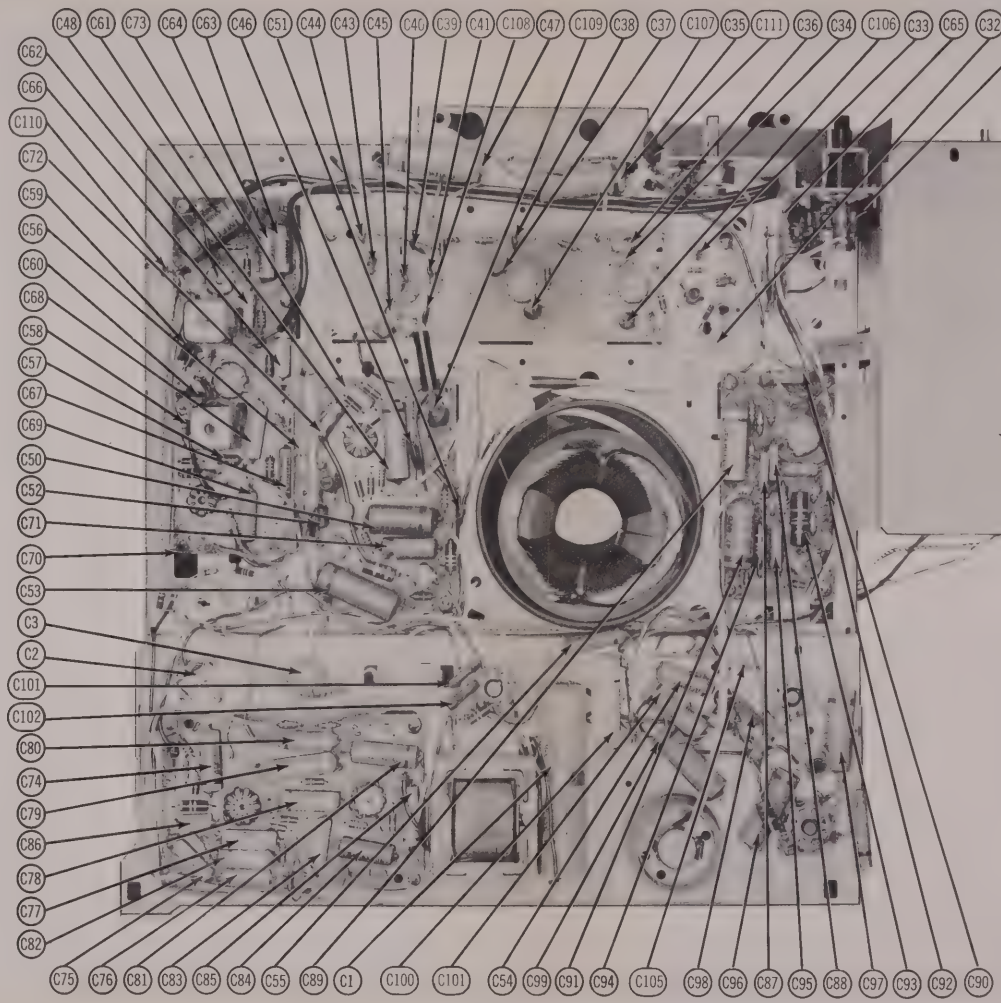
DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
29. Direct	High side to point Ⓐ. Low side to chassis.	Not used	45.5MC (400%Mod)	3	Vert. Amp. to point Ⓒ. Low side to chassis.	A37	Short out tuner AGC at point Ⓘ. Adjust scope for maximum gain. Adjust A37 for MINIMUM 400% indication on scope. If necessary A37 may be adjusted in the field to provide additional rejection of a specific frequency. Exercise care so that A37 is not tuned into channel 2 reducing that channel's sensitivity. Remove short from tuner AGC at point Ⓘ.
30.	RF input of heterodyne frequency meter to end of insulated wire inserted in hole provided for adjustment of A30. Be careful that wire does not touch any of the tuned circuits as this may cause oscillator shift.	"	Set freq. meter to 227MC	8	Not used	A38, A39, A38 "	Preset A38 to read -3 volts at point Ⓓ. Turn fine tuning control fully clockwise. Adjust bias to read -4 volts at point Ⓓ. Adjust A39 for audible beat on frequency meter. Adjust A38 clockwise until beat note just begins to change, then turn one full turn in same direction. Return fine tuning control to its mid-range position.
31.	Note: If channel 8 oscillator frequency cannot be reached by adjustment of A39, switch to channel 13 and adjust A17 for channel 13 oscillator frequency. Switch to channel 12 and adjust A18 for channel 12 oscillator frequency. Continue to channel 8. Adjust proper oscillator trimmer to obtain oscillator frequency on each channel. Also, on channel 8 adjust A39 for channel 8 oscillator frequency. Switch back to channel 13 and adjust A17, then back to channel 8 and again adjust A39.						

RCA VICTOR MODELS 21-S-632, U, 21-S-6052, U, 21-S-6053, U, 21-S-6057, U (Ch. KCS95, A, B, C)

ALIGNMENT INSTRUCTIONS (cont)

KRK33B, KRK33C TUNER UNIT VHF ALIGNMENT (CONT)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
32.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert. Amp. to point Ⓖ. Low side to chassis.	A29, A30, A31, A40	Set A6 fully counter clockwise. Set scope gain to maximum and attenuate generator output for minimum input signal that will produce usable pattern on scope. Adjust for response similar to Fig. 4. Adjust A40 for maximum amplitude between markers. A29 affects bandpass. A31 affects tilt (when A40 is properly adjusted). A30 affects the response bandwidth.
33.	Connect the DC probe of a VTVM to point Ⓖ. Common to chassis. Adjust A38 for negative 3 volts at point Ⓖ. Repeat steps 31 and 32.							
34.		Connect frequency meter as in step 30.	Not used	Freq. meter to 257MC	13	Not used	A17	Rotate fine tuning control maximum clockwise. Adjust A17 for maximum audible beat on freq. meter. SLIGHTLY overshoot the adjustment an additional turn in the same direction, then adjust A16 to again obtain an audible beat.
35.	Two 130Ω Carbon Resistors	Across VHF antenna terminals with 300Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point Ⓖ. Low side to chassis.	A32, A33	Adjust for proper response as shown in Fig. 4. Turn off generator and check oscillator voltage at point Ⓖ using VTVM as in step 33. If A38 required readjustment turn sweep generator back on and recheck channel 13 response. If necessary, retouch A32 and A33 for desired response.
36.		Connect frequency meter as in step 30.	Not used	Freq. meter to 227MC	8	Not used	A16	Check for audible beat on frequency meter. If necessary adjust A16 for proper oscillator frequency.
37.	Two 130Ω Carbon Resistors	Across VHF antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	"	Vert. Amp. to point Ⓖ. Low side to chassis.	A29, A30, A31, A40	If necessary retouch A29, A30, A31 and A40 to obtain response similar to Fig. 4. If A31 required adjustment, turn off generator and switch to channel 13 and check oscillator injection voltage as in step 33. If necessary, repeat steps 35, 36 and 37 until proper response is obtained.
38.		Connect Frequency meter as in step 30.	Not used	Freq. meter to 129MC	6	Not used	A24	Set fine tuning control to its mid-range position. Adjust A24 for audible beat on frequency meter.
39.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	"	Vert. Amp. to point Ⓖ. Low side to chassis.	A34, A35, A36	Adjust for response curve similar to Fig. 7. Check oscillator injection voltage as in step 33. Readjust A38 if necessary.
40.	If A38 required adjustment, switch receiver and generator to channel 8. Readjust A31 for response similar to Fig. 4. Recheck A16 and A39 for proper oscillator frequency as in step 30.							
41.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. Amp. to point Ⓖ. Low side to chassis.		Check for response similar to Fig. 7. Check oscillator injection voltage for each channel at point Ⓖ. If markers fall below 80% on any one channel, retouch A35 and A36 to obtain response curves within proper limits.
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
42.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 7. Check oscillator injection voltages for each channel at point Ⓖ. If markers fall below 80% on any one channel retouch A29, A30 and A31 to obtain response curves within proper limits.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
43.		Connect frequency meter as in step 30.	Not used	Freq. meter to 257MC	13	Not used	A17	Adjust individual channel oscillator slug for audible beat on each channel. Recheck oscillator injection voltage on each channel at point Ⓖ to verify that the voltages are within limits 2 volts MINIMUM and 5.5 volts maximum.
				251MC	12		A18	
				245MC	11		A19	
				239MC	10		A20	
				233MC	9		A21	
				227MC	8		A22	
				221MC	7		A23	
				129MC	6		A24	
				123MC	5		A25	
				113MC	4		A26	
				107MC	3		A27	
				101MC	2		A28	



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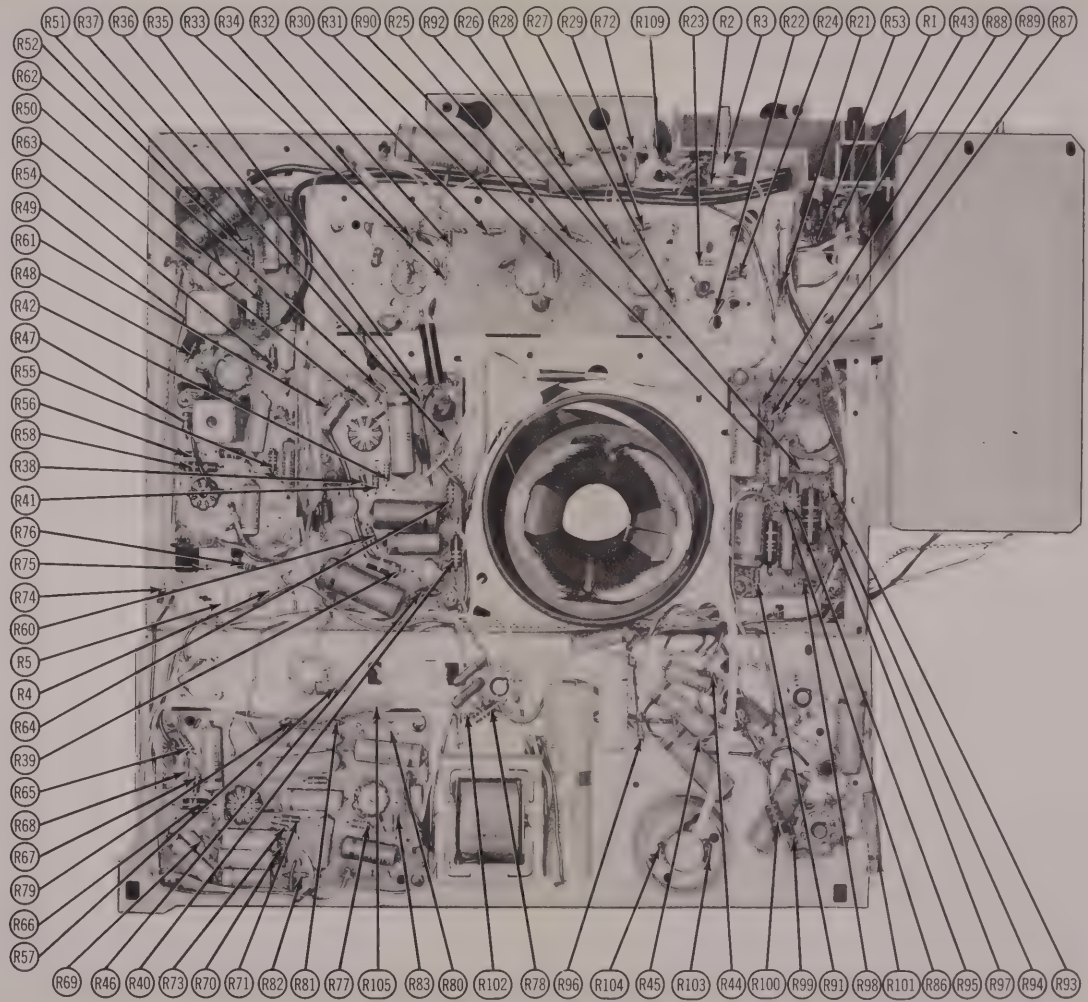
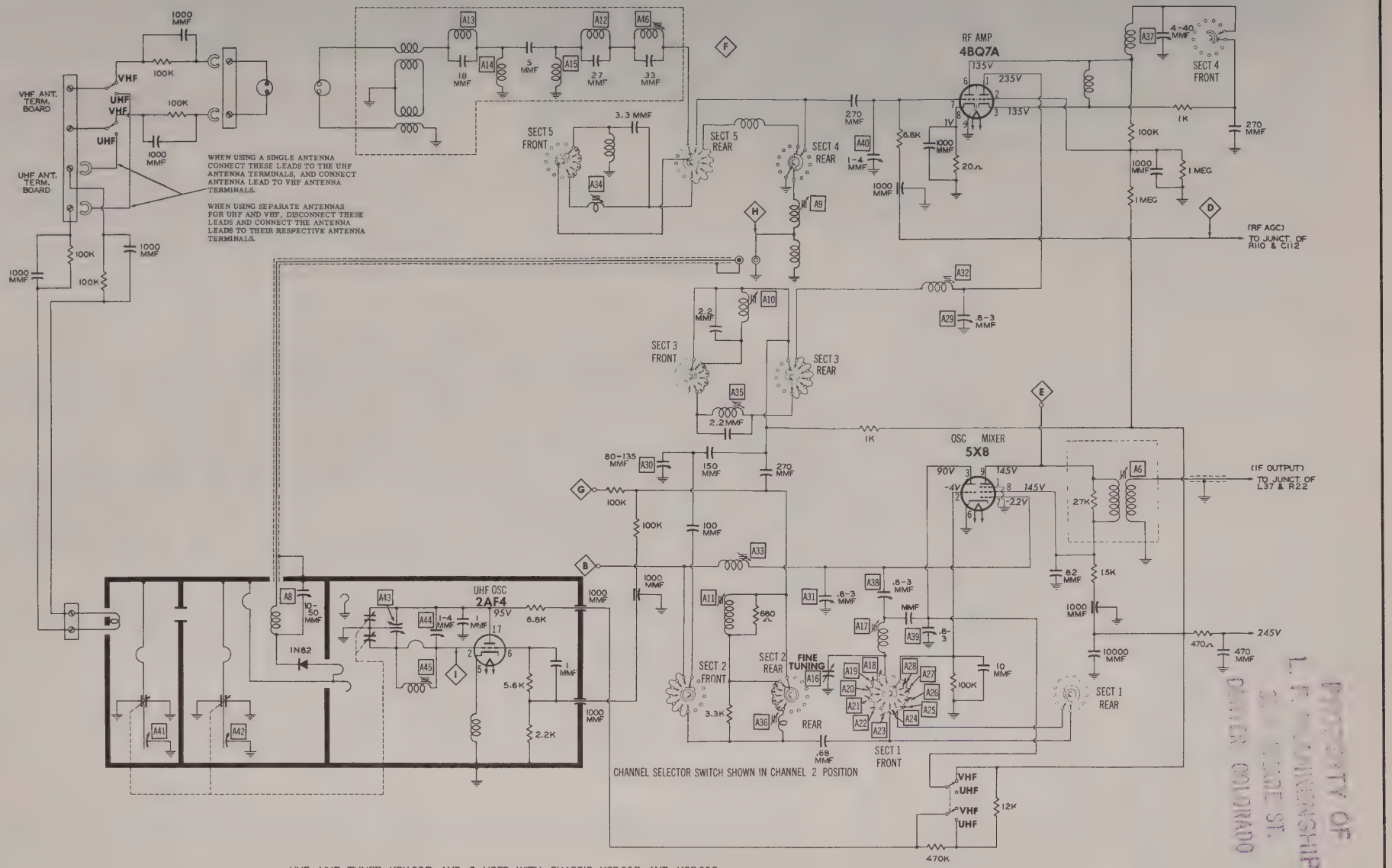
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION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4BQ7A
OSC MIXER
5X8
UHF OSC
2AF4
SECT 1 FRONT
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SECT 2 FRONT
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SECT 3 REAR
SECT 4 FRONT
SECT 4 REAR
SECT 5 FRONT
SECT 5 REAR
FINE TUNING
VHF ANT. TERM. BOARD
UHF ANT. TERM. BOARD
WHEN USING A SINGLE ANTENNA CONNECT THESE LEADS TO THE UHF ANTENNA TERMINALS, AND CONNECT ANTENNA LEAD TO VHF ANTENNA TERMINALS.
WHEN USING SEPARATE ANTENNAS FOR UHF AND VHF, DISCONNECT THESE LEADS AND CONNECT THE ANTENNA LEADS TO THEIR RESPECTIVE ANTENNA TERMINALS.
(RF AGC) TO JUNCT. OF R110 & C112
(IF OUTPUT) TO JUNCT. OF L37 & R22
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 2 POSITION
1N82
245V
470K

UHF-VHF TUNER KRK33B AND C USED WITH CHASSIS KCS95B AND KCS95C

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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DENVER, COLORADO

ALTERNATE VHF-UHF TUNER SCHEMATIC

RCA VICTOR MODELS 21-S-632, U, 21-S-6052, U, 21-S-6053, U, 21-S-6057, U (Ch. KCS95, A, B, C)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amplifier	3CB6	
V2	Mixer-Oscillator	5U8	
V3	1st. Video IF Amplifier	3CF6	
V4	2nd. Video IF Amplifier	3CB6	
V5	3rd. Video IF Amplifier- Video Detector	5AS8	
V6	Video Output-Sync Sep.	6AW8	
V7	Sound IF Amp.-AF Amp.	5U8	
V8	Ratio Detector	3AL5	
V9	Audio Output	5AQ5	
V10	Sync Amp.-Vert. Mult.	6CQ7	
V11	Vert. Mult.-Vert. Output	5AQ5	
V12	Horiz. AFC-Horiz. Osc.	6CQ7	
V13	Horiz. Output	12BQ6GT/B 12CU5	
V14	Damper	12AX4GTA	
V15	HV Rectifier	1X2B	

PICTURE TUBE

ITEM No	RCA Victor PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V16	21ALP4A①	21ALP4A ① 21ALP4	21ALP4A ① 21ALP4 21ALP4A B ②	① Aluminized ② Silver screen "89"

NOTE: In some versions of Model 21-S-632 only, a special picture tube was used originally. The tube may be identified by a circular, colored label cemented to the neck of the tube. This special cathode-ray tube DOES NOT require an ion trap. If replacement of this tube is necessary, replace with a type 21ALP4A which requires an ion trap. The correct ion trap to be used on the replacement tube will be found in a container inside the cabinet of the receiver.

ELECTROLYTIC CAPACITORS

ITEM No	RATING CAP.	RATING VOLT	RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	150	200	PRI-100	K210400	WS427	TD-150-300		S-150	RS185 *
C2	150	350	54A315	XA512	FP223.5	TM-150-450		D-177	TVL-3635
C3A	±100	350	100044	AF1H-56-60	C153	FP450.35	TM-4132	Q-230	TVL-4633
B	±20	350			BR3035			MT-0525	
C	10	350							
D	20	50							

* Unit must be ordered from Mfgr.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	1000	1000	100134	HYD-15-1000	DD-102	VD1	1R5KV-103	DC3021	10HKB-D1	
C5	1000	1000	100134	HYD-15-1000	DD-103	VD1	1R5KV-102	DC3031	10HKB-D1	
C6	18				TCZ-18	Z022	NPOK-180			
C7	5			NPO-D15	TCZ-4R7	Z011	NPOA-050	Z7-555	5TCCB-V47	
C8	27				TCZ-27	Z027	NPOK-270			
C9	33			NPO-S133	TCZ-33	Z029	NPOL-330	Z7-5433	5TCC-Q33	
C10	270		7T339	S1230	D6-371	TP39	GP2K-271	UC-5327	5GA-T27	
C11	1000		7T094		MFT-1000					
C12	1-4		7S533		S29-4		S115-01-10	C7551		
C13	1000		7T353	BPD-001	DD-102	KD69	831-471	DC-531	5HK-D1	
C14	18		54207		TCZ-18	Z022	NPOK-180			
C15	1000		7T252	BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1	
C16	1000		7T353	BPD-00047	DD-471	KD69	831-471	UC-5347	5GA-T47	
C17	10000		73960	BPD-01	DD-103	KD82	611-01	DC-511	5HK-E1	
C18	1000		7T353	BPD-00047	DD-471	KD69	831-471	UC-5347	5GA-T47	
C19	270		7T338	S1270	D6-371	TP41	GP2K-271	UC-5327	5GA-T27	
C20	270		7T338	S1270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C21	390		7T341	S1290	D6-391	TP44	GP2K-391	UC-5339	5GA-T39	
C22	1-4		7S533		S29-4		S115-01-10	C7551		
C23	2									
C24	10		7T865	NPO-S10	TCZ-10	TZ09	NPOA-100	Z7-541	5TCC-Q1	
C25	12		79710		D6-120	G019	GP1K-120	UC-5343	5GA-Q12	
C26	1000		7T084		MFT-1000					
C27	1000		7T084		MFT-1000					
C28	470		7T393	BPD-00047	DD-471	KD69	831-471	UC-5347	5GA-T47	
C29	1000		7T084		MFT-1000					
C30	83		78603	SI82	D6-830	G040	901-830		5GA-Q82	
C31	100		79715	BPD-001	DD-101	KD63	801-101	UC-531	5GA-X1	
C32	15		39064	N750-S15	TCN-15	TN03	N750K-150		5TCU-Q15	
C33	1000		77352	BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1	
C34	470		78623	BPD-00047	DD-471	KD69	831-471	UC-5347	5GA-T47	
C35	.39	200	79318		Z018					
C36	470		7T393	BPD-00047	DD-471	KD69	831-471	UC-5347	5GA-T47	
C37	1000		78623	BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1	
C38	1000		77353	BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1	
C39	1000		7T353	BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1	
C40	220		100672	DI-00022	DD-221	G061	811-221	UC-5323	5GA-T22	
C41	1000			BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1	
C42	1000		77352	BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1	
C43	9		10200	NPO-S13	TCZ-13R3	Z007	NPOA-090	Z7-553	5TCCB-V33	Note 1
C44	1000		77353	BPD-001	DD-103	KD69	801-001	DC-531	5HK-D1	Note 1
C45	8		10344	MPO-S18.2	Z018					
C46	10000		73960	BPD-01	DD-103	KD82	611-01	DC-103	5HK-E1	
C47	.47	200	73797	P288N-47		CUSB2P47		PT4047	2TM-P47	
C48	.1	400	73794	P468N-1	DF-104	CUB4P1		PT401	4TM-P1	
C49	5000	500	73800	DI-501	DD-503	KD73	GP2L-102	DC2551	1FM-S1	
C50	.47	200	99334	P285N-47		CUSB2P47		PT4047	2TM-P47	
C51	470		77353	BPD-00047	DD-471	KD69	831-471	UC-5347	5GA-T47	
C52	27		10353		TCZ-27	TZ18	NPOL-270			
C53	.22	600	100346	P568N-23		CUSB2P23		PT6022	6TM-P22	
C54	.047	200	73797	BPD-05	DF-503	CUSB2P47		PT4047	2TM-P47	
C55	.023	400	73562	BPD-02	DF-203	CUSB232	S17-02	PT4127	4TM-S23	
C56	3		78507	NPO-S13	TCZ-3R3	Z007	NPOA-030	Z7-5533	5TCCB-V33	
C57	39		100350							
C58	56		79334	N750-S156	TCN-56	S036	N750K-560			
C59	10000		73960	BPD-01	DD-103	KD82	611-01	DC-511	5HK-E1	
C60	10000		73960	BPD-01	DD-103	KD82	611-01	DC-103	5HK-E1	
C61	.47	200	79148	P288N-47		CUSB2P47		PT4047	2TM-P47	
C62	1000	500	78623	DI-001	DD-102	KD73	GP2L-102	MC355	1FM-S1	
C63	.0027	400	73597	S1270	D6-272	TP99	GP2-333-272	UC-5327	5GA-D27	
C64	.0082	400	73919							
C65	.01	300	79316	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C66	.01	300	79014	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C67	.0027	400	73597	S1270	D6-272	TP99	GP3-333-272	UC-5327	5GA-D27	
C68	.01	400	73561	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C69	.0033	1000	73519	BVD-11-3330	DD-302	CUB1S033	1R5KV-332	PT1S233	10TM-D33	
C70	4700		73473	BPD-0047	DD-472	WC79	511-0047	DC-521	5HK-D47	
C71	.1	400	77423	P468N-1	DF-104	CUB4P1		PT401	4TM-P1	
C72	330	500	39040	S1230	D6-331	SW5T33	GP2K-331	UC-5333	1FM-S33	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C73	330	500	39040	S1330	D6-331	SW5T33	GP2K-331	UC-5333	1FM-333	
C74	.033	400	73553		BPD-03	DF-303	CUSB233		PT5133	6TM-S33
C75	.01	400	73561		BPD-01	DE-103	CUB4S1	GP3-333-103	PT411	4TM-S1
C76	.0022	900	73595		S2200	D6-222	CUSB2S3	GP2-333-223	PT5223	5TM-S22
C77	.0047	600	73930		1454-0047		1R5D47		MC3465	MB-347
C78	.033	600	73799		BPD-03	DF-303	CUSB633	S17-03	PT5133	6TM-S33
C79	.068	400	73792		P468N-068		CUSB468			4TM-S68 Note 2
C80	.022	500	79925		BPD-02	DF-203	CUSB422	S17-01	PT4122	4TM-S22 Note 3
C81	.068	300	79015		P468N-068		CUSB468			4TM-S68
C82	.0039	400	79018		1454-0039		1W5D39		MC3463	MB-339
C83	.018	400	79510							
C84	.027	600	100303				1R5D12	811-122		MB-312
C85	.001	1600	73949		P168N-001	DC30-102	CUS1SD1	1R5KV-102	PT1S31	MB-D1
C86	330	500	39038			DD-331	S1R5123	GP2K-331	DC-5333	MB-333
C87	82	1000	78474						MC1.462	
C88	68	1000	78475			DD-680		1R5KV-680	MC1.460	
C89	.1	400	73561		P468N-1	DF-104	CUB4P1		PT401	4TM-P1
C90	.033	400	79923		BPD-02	DF-303	CUSB433	S17-02	PT4123	4TM-S23
C91	.47	200	98134		P285N-47		CUSB247		PT4047	2TM-P47
C92	330	1000	76476							
C93	.01	800	73594							
C94	.0012	600	76925		1454-0012		1R5D12	811-122		MB-312
C95	680	1000			HYD-15-680	DD-681	VT68	1R5KV-681	MCK368	10GA-T68 Note 4
C96	.1	400			P468N-1	DF-104	CUB4P1		PT401	4TM-P1
C97	.47	200	73786							
C98	270	1000	79022			DD-271			MCK327	
C99	.047	1000	73597		P068N-047		CUSB685		PT6847	
C100	.1	800			P868N-1	DF-104	CUB4P1		PT801	6TM-P1
C101	.1	400	73561		P468N-1	DF-104	CUB4P1		PT401	4TM-P1
C102	150	3500	100453		BVD-35-150	DD30-151	V3T15	3KV-151		30GA-T15
C103	150	2500	100453		BVD-30-150	DD30-151	V3T15	3KV-151		30GAB-T15
C104	150	3500	100453		BVD-30-150	DD30-151	V3T15	3KV-151		30GAB-T15
C105	56		71924		S156	D6-560	TP31	GP1K-560	UC-5456	5GA-Q56
C106	1000		77353		BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1
C107	1000		77353		BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1
C108	1000		77353		BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1
C109	470		77353		BPD-00047	DD-471	KD69	831-471	UC-5347	5GA-T47
C110	1000		77353		BPD-001	DD-102	KD69	801-001	DC-521	5HK-D1
C111	1000		100310		BPD-001	DD-103	KD69	811-01	DC-511	5HK-D1
C112	22	200	78805		P228N-022		CUSB2P23		PT4023	2TM-P22 Note 5

Note 1. Some versions use 4700MMF in this application (part #73473).
Note 2. Some versions use .047MFD in this application.
Note 3. Some versions use .01MFD in this application.
Note 4. Some versions use 470MMF in this application (part #59667).
Note 5. Used only in chassis KC595B and KC595C.
Note 6. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3000Ω	½	100323		RTV-544	QJ-382 *	UE-4135	Contrast (Panel) Tap at 1850Ω
B	1Meg	½						Volume & Switch (Rear) Tap at 200KΩ
R2A	1. 5Meg	½	100327	AB-742	A47-1.5Meg-B	Q11-138	TA15L	Vertical Hold
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R2A.
R3A	200KΩ	½	100258	B-46	A47-200K-S	Q11-129	U-63	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A.
R4A	5Meg	½	100290	AB-97	A47-5Meg-S	Q11-161	SU-67	Height
B	Shaft		100601	AK-3	FS-3	TQ	Not Req.	Attach to R4A.
R5A	2. 5Meg	½	100291	BK-83	A47-2.5Meg-S	Q11-239	SU-565	Vertical Linearity
B	Shaft		Not Req.	Not Req.	RN-3	TQ	Not Req.	Attach to R5A.
R6	7. 5Meg	½	100601					Local-Distant-Note 1

Note 1. Used in KC595B and KC595C chassis only.
* Concentrik® Equivalent, K-6 Kit, Base Elements and Shafts; BU-113X, P17-105 (Panel) BU-137X, R1-118 (Rear) 76-1 (Switch)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	RCA Victor PART No.	IRC PART No.	NOTES
R7	100KΩ		502410	BTS-100K	
R8	100KΩ		502410	BTS-100K	
R9	33KΩ		502332	BTS-33K	
R10	56KΩ		502356	BTS-56K	
R11	47KΩ	1	512347		
R12	1000Ω		502302	BTS-1000	
R13	47Ω		502047	BTS-47	
R14	100KΩ		502410	BTS-100K	
R15	100KΩ		502410	BTS-100K	
R16	2700Ω		502327	BTS-2700	
R17	100KΩ		502410	BTS-100K	
R18	5600Ω		502356		
R19	120Ω		502121	BTS-120	
R20	470Ω		502147	BTS-470	
R21	1000Ω		502302	BTS-1000	Note 9
R22	5300Ω	5%	502310	BTS-1000 5%	Note 1
R23	22KΩ		502322		Note 3
R24	1000Ω		502302	BTS-1000	
R25	560Ω		502166	BTS-560	
R26	390Ω		30488	BTS-390	
R27	470Ω	5%	502047	BTS-47 5%	
R28	150KΩ	5%	502415		
R29	150KΩ	5%	502415		
R30	560Ω		502166	BTS-560	
R31	220Ω	5%		BTS-22 5%	Note 3
R32	47KΩ		502347	BTS-47K	
R33	150Ω	5%	502113	BTS-150 5%	
R34	47Ω	5%	502047	BTS-47 5%	
R35	39000Ω	5%	502339	BTS-39K 5%	
R36	68KΩ		502368	BTS-68K	
R37	680KΩ		502468	BTS-680K	
R38	1Meg		502510	BTS-1Meg	
R39	5600Ω	2	502356	BTS-5600	
R40	56KΩ		512356	BTS-56K	
R41	2200Ω		502322	BTS-2200	
R42	33KΩ		502333	BTS-33K	
R43	3300Ω		502333	BTS-3300	
R44	22KΩ		502322	BTS-22K	
R45	270KΩ		502427	BTS-270K	

ITEM No.	RATING OHMS	RATING WATT	RCA Victor PART No.	IRC PART No.	NOTES
R46	180KΩ		502415	BTS-150K	
R47	47KΩ		502347	BTS-47K	
R48	12KΩ		502312	BTS-12K	
R49	10000Ω		502310	BTS-3000	
R50	39KΩ		502339	BTS-39K	
R51	100KΩ	5%	502310	BTS-10K 5%	
R52	10KΩ	5%	502310	BTS-10K 5%	
R53	47KΩ		502347	BTS-47K	
R54	10Meg		502510	BTS-10Meg	
R55	330KΩ		502433	BTS-330K	
R56	470KΩ		502447	BTS-470K	
R57	1800Ω	3	522318	BTS-1800	
R58	470Ω	1	512147	BTA-470	
R59	470KΩ		502447	BTS-470K	
R60	18KΩ		502318	BTS-18K	
R61	270KΩ		502427	BTS-270K	
R62	5. 5Meg		502515	BTS-1. 5Meg	
R63	1. 5Meg		502515	BTS-1. 5Meg	
R64	390KΩ		502439	BTS-390K	
R65	33KΩ		502333	BTS-33K	
R66	10KΩ	1	512310	BTA-10K	
R67	3300Ω	5%	502333	BTS-3300	
R68	560KΩ		502256	BTS-560K	
R69	22KΩ		502322	BTS-22K	
R70	18KΩ		502318	BTS-18K	
R71	6. 8Meg		502568	BTS-6. 8Meg	
R72	470KΩ		502447	BTS-470K	
R73	1Meg		502510	BTS-1Meg	
R74	5. 5Meg		502559	BTS-5. 5Meg	Note 4
R75	1Meg		502510	BTS-1Meg	Note 4
R76	470KΩ		502447	BTS-470K	
R77	470KΩ		502447	BTS-470K	
R78	150Ω	1	512115	BTA-150	
R79	150KΩ		502415	BTS-150K	
R80	820Ω		502383	BTS-820	
R81	15KΩ		502315	BTS-15K	
R82	22KΩ		502333	BTS-22K	
R83	22KΩ	5%	502333	BTS-22K 5%	
R84	56KΩ				

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	RCA Victor PART No.	IRC PART No.	NOTES
R85	560Ω		502422	BTS-560	
R86	220KΩ		502422	BTS-220K	
R87	330KΩ		502433	BTS-330K	
R88	820KΩ		502482	BTS-820K	
R89	100KΩ	5%	502410	BTS-100K 5%	
R90	82KΩ		502382	BTS-82K	
R91	3900Ω		502339	BTA-3900	
R92	150KΩ	5% 1	512415	BTA-150K 5%	
R93	6. 8Meg		502568		
R94	47KΩ		502347	BTS-47K	
R95	39KΩ	1	512339	BTA-39K	
R96	68KΩ		502368	BTS-68K	
R97	820KΩ		502482	BTS-820K	
R98	1Meg		502510		
R99	47Ω		502047		
R100	6800Ω	2	522268		
R101	100Ω	2	74015	BW2-100	
R102	47000Ω		502447		
R103	1. 8Ω		100305	BW1-. 8	
R104	10000Ω		502410	BTS-10K	
R105	40000Ω	7	77868	PW7-4000	
R106	5. 8Ω	4	100117		
R107	38Ω	5	512415	1 3/4A-40	
R108	450Ω		100118		Note 5
	Cold				
	9. 5Ω Hot				
R109	470KΩ		502447	BTS-470K	
R110	560KΩ		502447	BTS-560K	Note 8
R111	1. 5Meg		502518	BTS-1. 5Meg	Note 8
R112	18KΩ		502318	BTS-18K	

Note 1. Some versions use a 580Ω ½W resistor in this application.
Note 2. Some versions use a 47KΩ ½W resistor in this application.
Note 3. Some versions use a 18Ω ½W 5% resistor in this application (Mfgr. Part No. 502018).
Note 4. Not used in some versions.
Note 5. Temperature compensating.
Note 6. Used in chassis KC595B and KC595C only.
Note 7. Not used in chassis KC595A and KC595C.
Note 8. Not used in chassis KC595B and KC595C.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Ram PART No.	Stancor PART No.	Thorderson PART No.	Triad PART No.
T1	Horiz. Output Trans.	100285	FB416 * 1	HVO-16 * 1	30D4 * 1	A-2525 1	FLY-16 * 1	D-50 * 1	
T2	Vert. Output Trans.	79394	21900 2	A-2623 2	V30T 2	A-2145 2	26873	A-108X 2	
T3A	Yoke(90°)Horiz.(19MH)	100586 3	DF607 3	MDF-92 3	T90F19A23	DY-16A 3	Y-16 3	Y-41-1 3	
B	Vert.(40MH)								
T4	Width Coil (2.7 to 17MH)	79144	RF800 4 7	MWC-11	20LR16	WC-8	WC-18	WC-12	

① Drill new mounting hole(s).
② Connect as auto transformer.
③ Use 9 to 1 turns ratio.
④ Includes capacitor C104; resistors R84, R85; 8 contact plug, RCA Part No. 100477.
⑤ Connect horizontal damping network across terminals #3 and #7. Use original if necessary.
⑥ Enlarge mounting hole.
⑦ Connect to terminals coded #1 and #2.
⑧ Connect to terminals coded red and blue.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thorderson Replacement Connections	Triad Replacement Connections
5	9	9		9	5	9	9
4	7	7	7	7	4	7	7
3	5	5	5	5	3	5	5
2	3	3	3	3	2	3	3
1	1	1	1	1	1	1	1
Connect Width Coil Across	1 & 3	1 & 3	1 & 3	1 & 3	1 & 2	1 & 3	1 & 3

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thorderson PART No.	Triad PART No.	NOTES
T5	7.5KΩ	3. 5Ω	100037	21003	A-3020	A-3849	26848	S-92	

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V C	IMP	RCA Victor PART No	QUAM PART No	RCA TYPE No	NOTES
SP1	4"	PM	3.5Ω		79696 1	4A07	223S1	① Used in Models 21S853, U, 21S853, U.
	8"	PM	2.5Ω		74684 2	8A21	208S2	② Used in Models 21S832, U.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI	DC RES. SEC	RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Trans.	.6Ω	.3Ω	100454				Note 1
L2	Ant. Matching Trans.	.6Ω	.3Ω	100454				Note 1
L3	IF Trap	0Ω						Note 1
L4	Ant. Shunt Coil	0Ω						Note 1
L5	Ant. Shunt Coil	0Ω						Note 1
L6	IF Trap	0Ω						Note 1
L7	FM Trap	0Ω						Note 1
L8	RF Choke	0Ω		77859				Note 1
L9	Ant. Coil	0Ω						Channel 2- Note 2
L10	Ant. Coil	0Ω		79738				Channel 3- Note 2
L11	Ant. Coil	0Ω		79716				Channel 4- Note 2
L12	Ant. Coil	0Ω		79714				Channel 5- Note 2
L13	Ant. Coil	0Ω		73461				Channel 6- Note 2
L14	Ant. Coil	0Ω		79727				Channel 8- Note 2
L15	Ant. Coil	0Ω		71469				Channel 9- Note 2
L16	Ant. Coil	0Ω		79713				Channel 10- Note 2
L17	Ant. Coil	0Ω		71472				Channel 11- Note 2
L18	Ant. Coil	0Ω		79713				Channel 13- Note 2
L19	Fil. Choke	0Ω		73477				
L20	RF Coil	0Ω		79731				Channel 3- Note 3
L21	RF Coil	0Ω		79737				Channel 5- Note 3
L22	RF Coil	0Ω		79717				Channel 4- Note 3
L23	RF Coil	0Ω						Channel 6- Note 3
L24	RF Coil	0Ω		73460				Channel 8- Note 3
L25	RF Coil	0Ω						Channels 9 thru 13- Note 3
L26	RF Coil	0Ω		77821				Channel 13- Note 3

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L27	Mixer Grid Coil	0Ω		79727				Channel 2-Note 4
L28	Mixer Grid Coil	0Ω		79715				Channel 3-Note 4
L29	Mixer Grid Coil	0Ω		77469				Channel 4-Note 4
L30	Mixer Grid Coil	0Ω		79729				Channel 5-Note 4
L31	Mixer Grid Coil	0Ω						Channel 6-Note 4
L32	Mixer Grid Coils	0Ω						Channel 7 thru 12-Note 4
L33	Mixer Grid Coil	0Ω		73461				Channel 13-Note 4
L34	Fil. Choke	0Ω		79720				Note 5
L35	Osc. Coils	0Ω		79722				Includes 27KΩ resistor
L36	Conv. Plate	.2Ω	.1Ω	79734				
L37	47.25MC Trap	0Ω		78204		TV-153	6225	
L38	1st Video IF	.2Ω	.2Ω	78203	17-4523	TV-130	6219	
L39	Fil. Choke	0Ω						Note 6
L40	2nd Video IF	1.1Ω	1.2Ω					Note 6
L41	Fil. Choke	0Ω						Note 6
L42	3rd Video IF	1.1Ω	1.2Ω					Note 6
L43	4th Video IF	1.1Ω	1.1Ω					Note 6
L44	Series Peaking Coil	2.8Ω		100359	19-3036	TV-180	6176	36 Microhenries
L45	Shunt Peaking Coil	12Ω		100360	19-3300		6155	300 Microhenries
L46	4.5MC Trap	2.8Ω		100358	20-1004	TV-151	1469	
L47	Series Peaking Coil	9Ω		100361	19-3300 *		6155 *	300 Microhenries;Wound on 6.8KΩ resistor
L48	Shunt Peaking Coil	12Ω		100362	19-3500		6174	510 Microhenries
L49	Shunt Peaking Coil	12Ω		100363	19-3500 ■		6174 ■	510 Microhenries;Wound on 1.8KΩ resistor
L50	Fil. Choke	0Ω		73477	19-3001	TV-189	4604	1 Microhenries
L51	Sound IF	2.5Ω		100365	17-1031		1470	
L52	Ratio Det.	10.5Ω	1ΩCT	100364				Tertiary Winding=.2Ω
L53	RF Choke	.72Ω		76640	19-1001		4604	1.5 Microhenries; IRC Part No. CL-1

Note 1. Part of complete assembly-includes L1 thru L7 and C6 thru C9-complete assembly Part No. 100454.
Note 2. Part of complete assembly-includes stator complete with rotor, L8 thru L18 and C10-complete assembly Part No. 79724.
Note 3. Part of complete assembly-includes stator complete with rotor, L20 thru L26, C19 and R12-complete assembly Part No. 79726.
Note 4. Part of complete assembly-includes stator complete with rotor L27 thru L33, C20, C23, R14, R15, R16. Complete assembly Part No. 79723.
Note 5. Complete assembly-includes stator complete with rotor and coils.
Note 6. Part of complete assembly.
* Parallel with 6.8KΩ resistor.
■ Parallel with 1.8KΩ resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L54	88Ω		79534			6211				Tapped ⓐ 63Ω Horiz. Osc.
L55	45Ω		100300							Horiz. Waveform

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L56	.230ADC	49.4Ω	.89HY	100286	C5037 ①	C-2996 ①	C-2326 ①	26C44 ①	C-17X ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

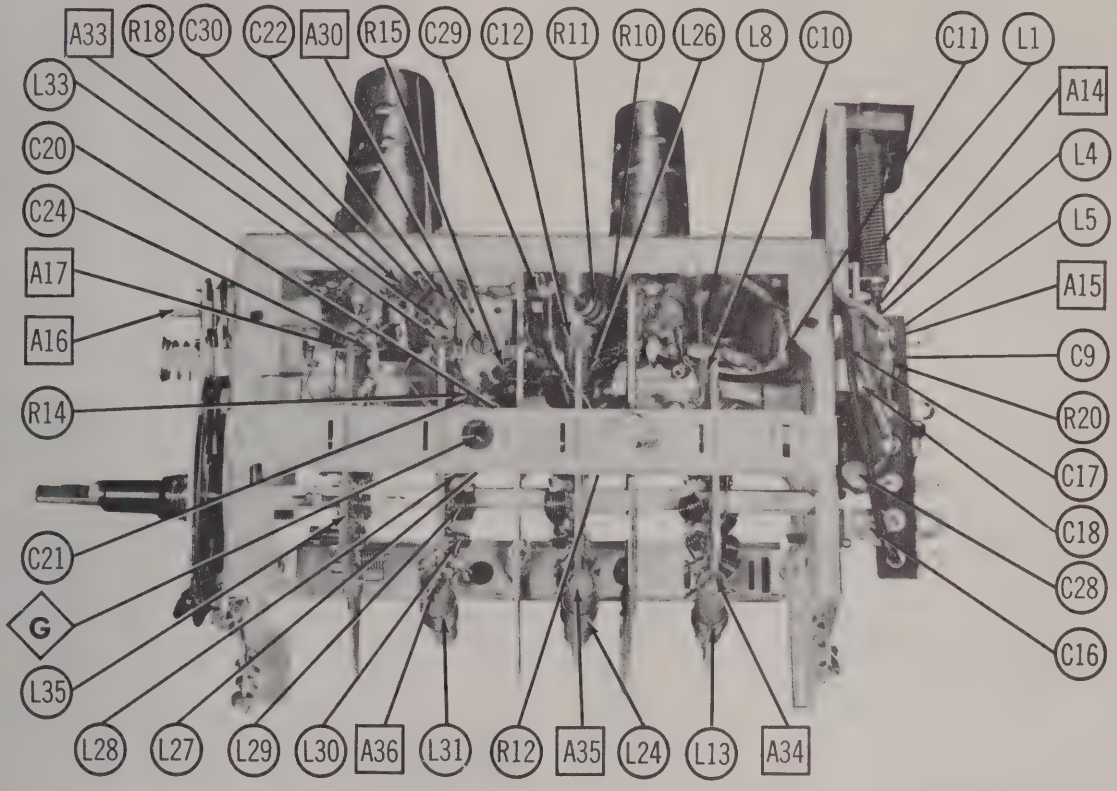
ITEM No.	RATING: CURRENT	REPLACEMENT DATA: RCA Victor PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.230ADC	100035	1236A	MR-300	6S300	6Q4	300	
M2	.230ADC	100035	1236A	MR-300	6S300	6Q4	300	

FUSES

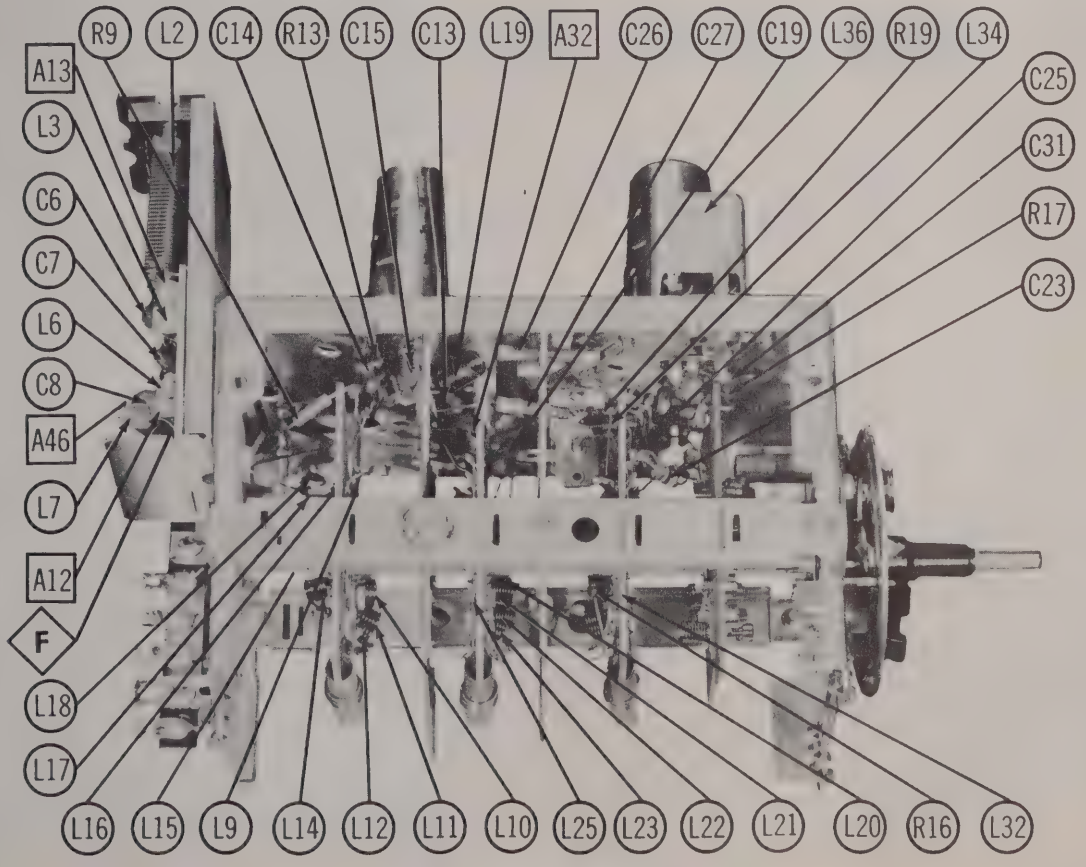
ITEM No.	TYPE	RATING	REPLACEMENT DATA: RCA Victor PART No. FUSE	RCA Victor PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M3	3AG	3/10A 250V	78214	78218	312.300 (3AG 3/10A)	357001	AGC 3/10	4405

MISCELLANEOUS

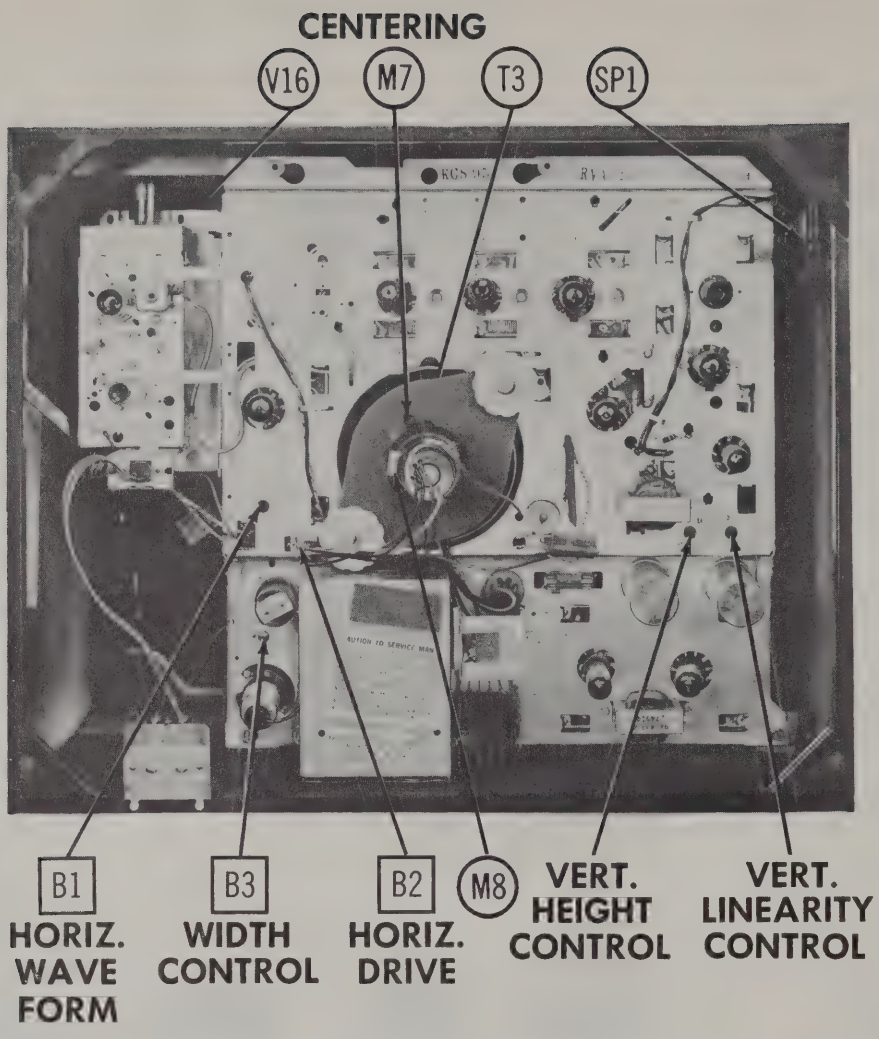
ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M4	Tuner	KRK32B	VHF-Models 21-S-6052, 21-S-6053, 21-S-632
M5	Tuner	KRK33B	VHF-UHF-Models 21-S-6052U, 21-S-6053U
	Tuner	KRK33C	VHF-UHF-Model 21-S-632U —
M6	Switch	100619	VHF-UHF-Models 21-S-6052U, 21-S-6053U, 21-S-632U
M7	Centering Device	100585	
M8	Ion Trap	76141	
A5	Trimmer Cap.	71496	Video IF Input Trimmer (4-70MMF)
B2	Trimmer Cap.	71807	Horiz. Drive (10-160MMF)
	Safety Glass	100575	Models 21-S-632, U
	Safety Glass	100959	Models 21-S-6052, U; 21-S-6053, U; 21-S-6057, U
	Mask	100574	Models 21-S-632, U



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

CHECK OF HORIZONTAL HOLD ADJUSTMENT

1. Turn the horizontal hold control fully clockwise. Approximately 12 diagonal bars should be sloping downward to the left. Turn the horizontal hold control slowly counter clockwise until $1\frac{1}{2}$ to 3 diagonal bars are present on the screen. The picture should pull in sync upon slight additional rotation of the horizontal hold adjustment and remain in sync for approximately an additional two turns in a counter clockwise direction. Further counter clockwise rotation should cause picture to lose sync with 2 to 5 diagonal bars present before motorboating occurs. Interrupted oscillation (motorboating)should occur before maximum counter clockwise rotation of the horizontal hold adjustment is reached.

2. If the receiver does not pass the above check, turn the horizontal width slug (B3) maximum counter clockwise. Adjust the horizontal drive trimmer (B2) counter clockwise for a bright vertical line near center of screen, then turn clockwise until line disappears. Set brightness control for maximum brightness and adjust B3 for a picture slightly wider than necessary to fill the picture mask horizontally. Adjust the horizontal waveform slug (B1) until 3 or 4 bars are present before motorboating occurs when the horizontal hold adjustment is turned counter clockwise from the point at which picture loses sync.

3. If the picture still will not sync properly, and the AGC control is properly adjusted, it will be necessary to perform the adjustments outlined under "horizontal hold and waveform alignment".
Note: AGC control used in UHF/VHF Models only.

HORIZONTAL HOLD AND WAVEFORM ALIGNMENT

The horizontal waveform adjustment is adjusted at the factory and normally will require no readjustment. If the horizontal hold coil (L54) or the horizontal waveform coil (L55) are replaced in set, scope adjustment will be necessary to synchronize the picture.

Short out (L55) with a clip lead and turn the horizontal hold slug all the way out. Rotate horizontal hold slug back in coil until picture locks in sync. Remove short from (L55). Connect the low capacity probe of an oscilloscope to terminal point (1) on schematic. Low side of scope to chassis. Adjust the horizontal waveform slug (B1) until the waveform on scope appears similar to Fig. 10. If necessary, during adjustment of B1, keep picture in sync with the horizontal hold. Remove the oscilloscope.
The sync action should now be as outlined in paragraphs 1 and 2 of "Check of Horizontal Hold Adjustment". If necessary, readjust the horizontal drive trimmer and horizontal width slug as in paragraph 2 of "Check of Horizontal Hold Adjustment."

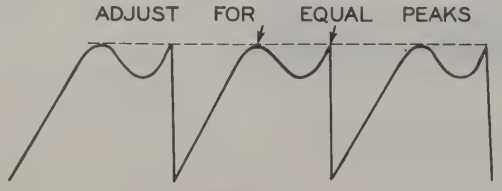
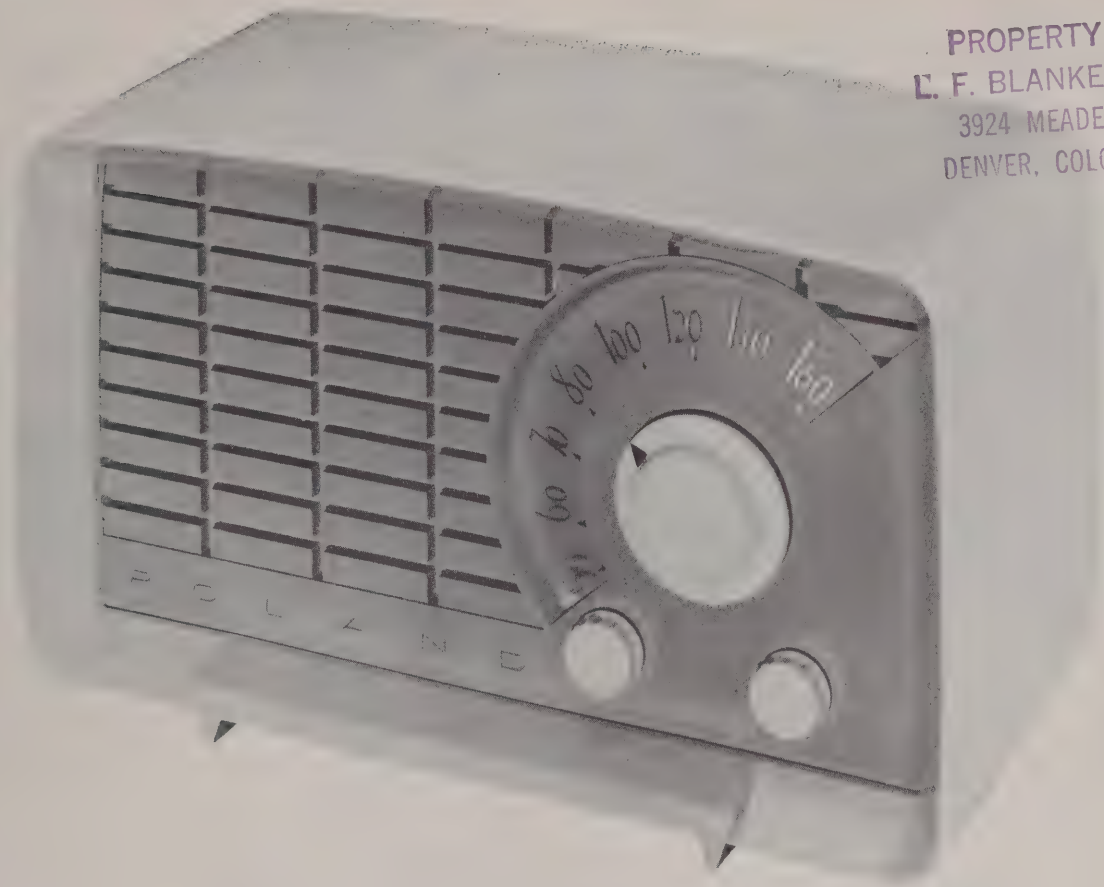


FIG. 10

RETMA MEMBER
RADIO-ELECTRONICS-TELEVISION MANUFACTURERS ASSOCIATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ROLAND
MODEL 5T6



ROLAND
MODEL 5T6

TRADE NAME	Roland Model 5T6
MANUFACTURER	Roland Radio Corp., 12-30 Anderson Ave., Mt. Vernon, N. Y.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
RATING	.22 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"

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PARTS LIST AND DESCRIPTIONS

ROLAND
Model 5T6

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AT6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ROLAND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150		PRS150V4040-20	BBRT44215	TCT3116	TDL-404020-150	FMT-315	TVA-3448
B	40	150							
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ROLAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C3	270			SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C4	.01	800		BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C5	270			SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C6	.01	800		BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C7	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C8	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C9	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ROLAND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½		AB-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch			KB-1	SWE-12	76-1	US-26	Attach to R1A.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

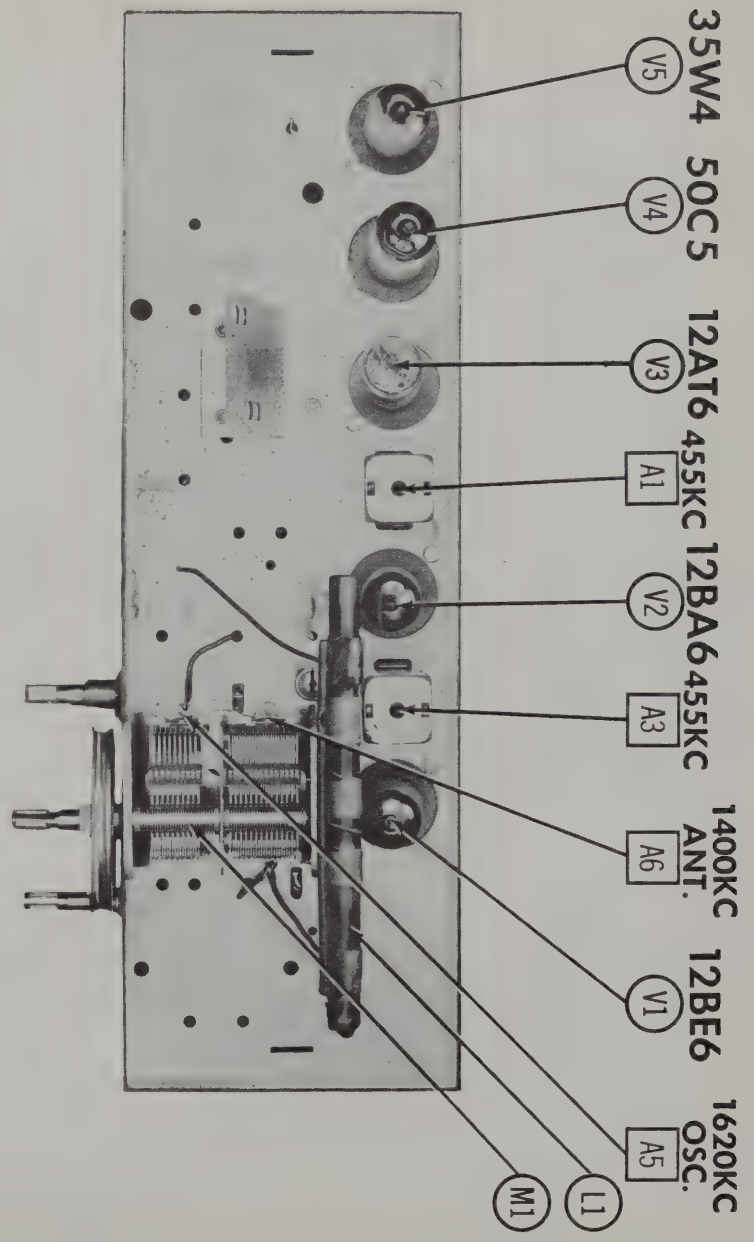
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ROLAND PART No.	IRC PART No.	
R2	22KΩ			BTS-22K	
R3	220Ω			BTS-220	
R4	2.2Meg			BTS-2.2Meg	
R5	4.7Meg			BTS-4.7Meg	
R6	220KΩ			BTS-220K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ROLAND PART No.	IRC PART No.	
R7	500KΩ			BTS-470K	
R8	150Ω	1		BTA-150	
R9	330Ω	1		BTA-330	
R10	2200Ω	1		BTA-2200	
R11	15Ω			BTS-15	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.75KΩ	3-4Ω		Z1101 ①	A-3025 ①	A-3332 ①	26S58 ①	S-12X ①	① Bend ears over frame.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ROLAND PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4 3/4"	PM	3-4Ω				

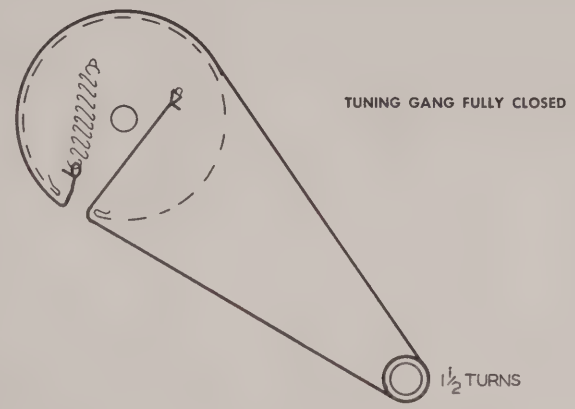
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ROLAND PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.4Ω						
L2	Osc. Coil	.5Ω	5.5Ω		14-1073 *		69-Osc.	
L3	Input IF	22Ω	22Ω	LF-50	16-6758	BC-352	12-C1	
L4	Output IF	22Ω	22Ω	LF-50	16-6758	BC-353	12-C2	

* Leads sufficient mounting support.
■ Drill new mounting hole.

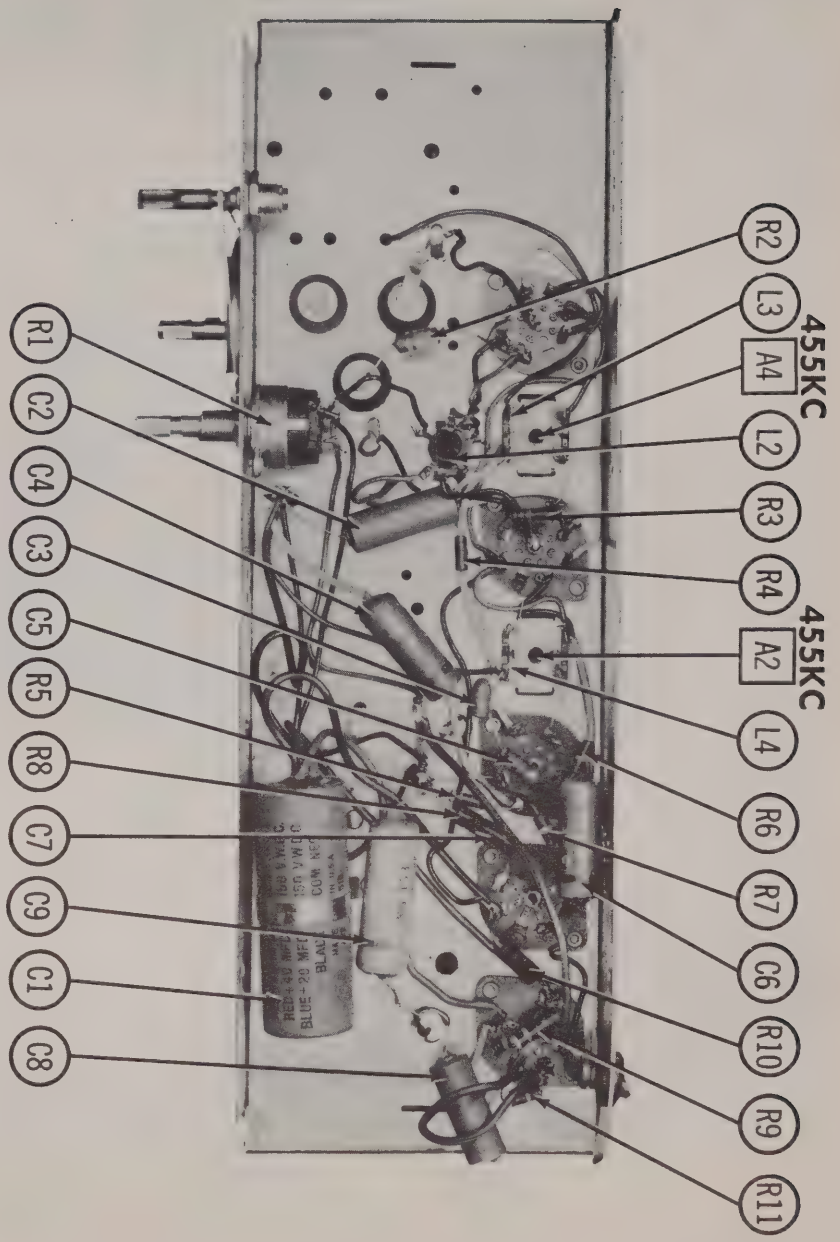
MISCELLANEOUS

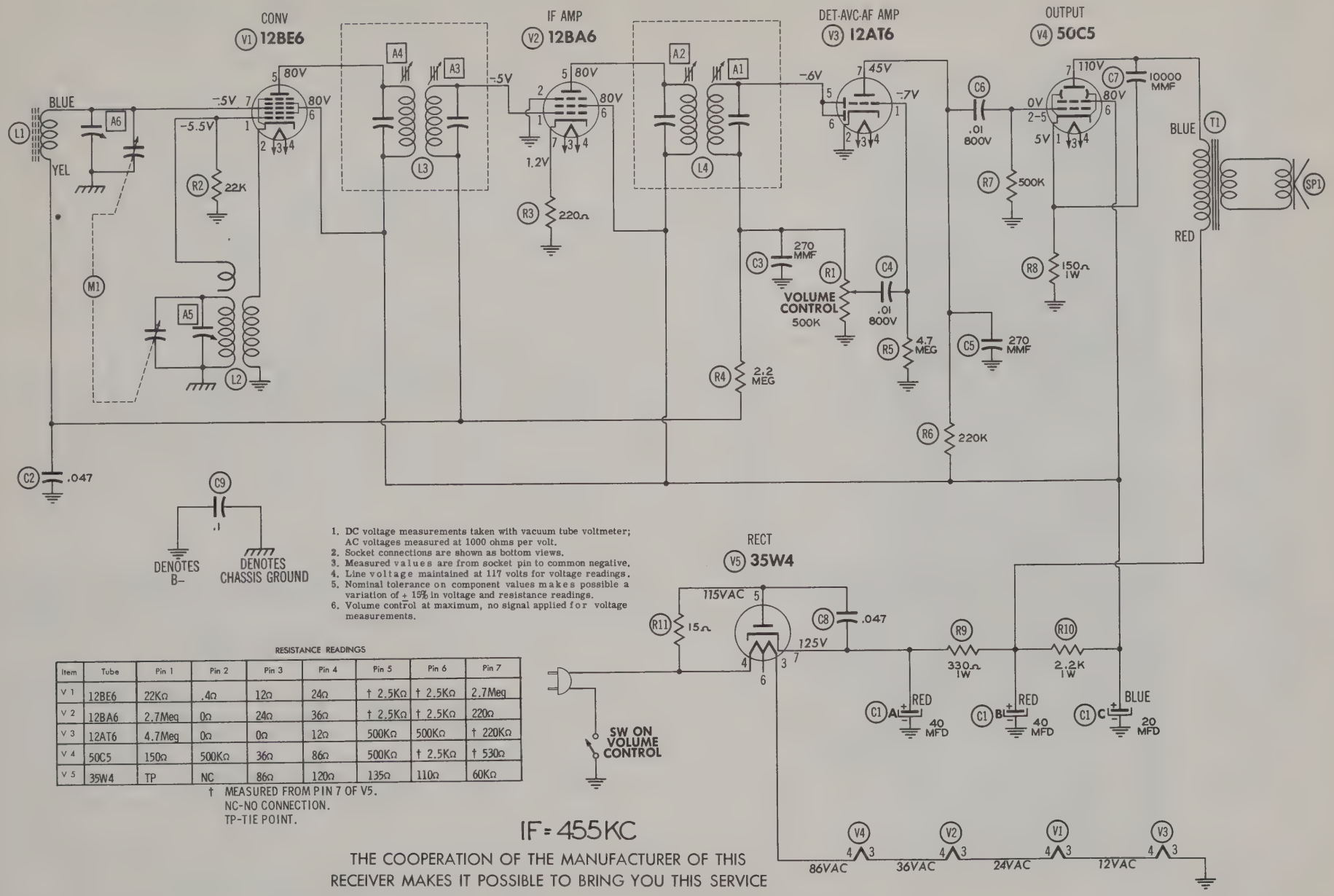
ITEM No.	PART NAME	ROLAND PART No.	NOTES
M1	Tuning Cap.	CV-52	2 Gang (47-472MMF, 29-195MMF)



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.4Ω	12Ω	24Ω	† 2.5KΩ	† 2.5KΩ	2.7Meg
V 2	12BA6	2.7Meg	0Ω	24Ω	36Ω	† 2.5KΩ	† 2.5KΩ	220Ω
V 3	12AT6	4.7Meg	0Ω	0Ω	12Ω	500KΩ	500KΩ	† 220KΩ
V 4	50C5	150Ω	500KΩ	36Ω	86Ω	500KΩ	† 2.5KΩ	† 530Ω
V 5	35W4	TP	NC	86Ω	120Ω	135Ω	110Ω	60KΩ

† MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.
TP-TIE POINT.

IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

STEELMAN
MODEL 3A16U

STEELMAN
MODEL 3A16U

TRADE NAME	Steelman Model 3A16U
MANUFACTURER	Steelman Phono & Radio Co., Inc., 12-30 Anderson Ave., Mt. Vernon, N.Y.
TYPE SET	AC Operated AM Superheterodyne Receiver with 3 Speed Automatic Record Changer
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AT6 Det-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.22 Amp. @ 117 Volts AC
TUNING RANGE--BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR V-M MODEL 954B - PHOTOFACT SET #302 - FOLDER #12.

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PARTS LIST AND DESCRIPTIONS

STEELMAN
Model 3A16U

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AT6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	150		PRS-150V8040	BBRT84215	TCT3117	TDL-804020-150	FMT-339	TVA-3445
B	40	150		20					
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C4A	220									
B	5000									
C	5000		♦	♦PA-113-2	♦PC-151	♦116TM2	♦1408-02		♦DT-2	
D	250									
E										
C5	2000			BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C6	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C7	.01	600		BPD-01	DD-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C8	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

♦ Items C4A, C4B, C4C, C4D, C4E, R6A, R6B, and R6C are combined in one unit. When replacing items separately, C4D and C4E should total 250MMF.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA STEELMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	VC-42	AB-70	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A.
R2A	100KΩ	½	VC-102	AB-41	A47-100K-Z	Q13-128	U-39	Tone
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA STEELMAN PART No.	IRC PART No.	NOTES
R3	22KΩ			BTS-22K	
R4	150Ω			BTS-150	
R5	2.2Meg			BTS-2.2Meg	
R6A	6.8Meg		♦		
B	470KΩ				
C	470KΩ				

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA STEELMAN PART No.	IRC PART No.	NOTES
R7	150Ω			BTS-150	
R8	330Ω	1		BTA-330	
R9	2200Ω	1		BTA-2200	
R10	22Ω	1		BTA-22	

♦ Items R6A, R6B, R6C, C4A, C4B, C4C, C4D, C4E are combined in one unit.

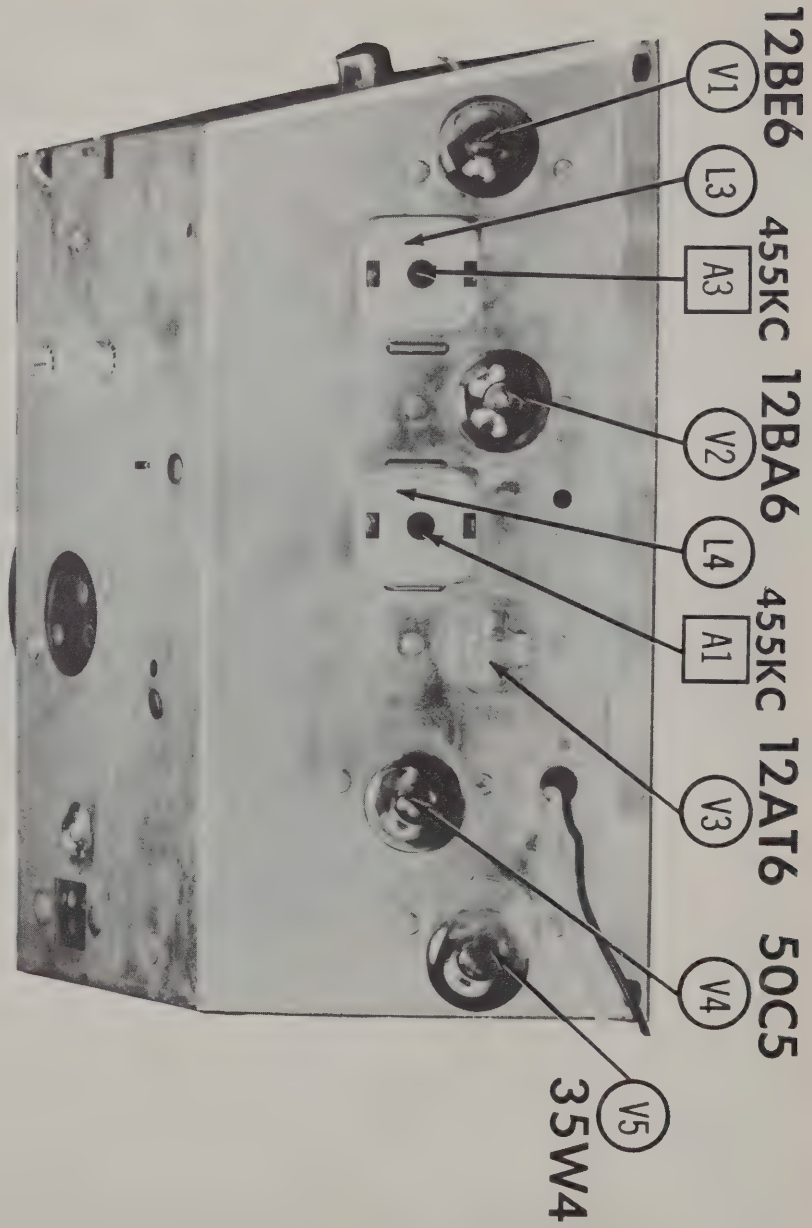
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA STEELMAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2.6KΩ	3-4Ω	TR-120	Z1101	A-3025	A-3332	22S45 ①	S-12X	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA STEELMAN PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	8"	PM	3-4Ω	SP-103-2	8A21	234S1	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA STEELMAN PART No.	REPLACEMENT DATA MEISSNER PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA MILLER PART No.	NOTES
L1	Ant. Coil	.5Ω					69-Osc. *	
L2	Osc. Coil	.5Ω	5.4Ω				12-C1	
L3	Input IF	22Ω	22Ω	LF-50	16-6758	BC-352	12-C1	
L4	Output IF	22Ω	22Ω	LF-50	16-6758	BC-353	12-C2	

* Drill new mounting hole.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA STEELMAN PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M1				46	0-1 or S-1 and 0-3	

ELECTRO VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

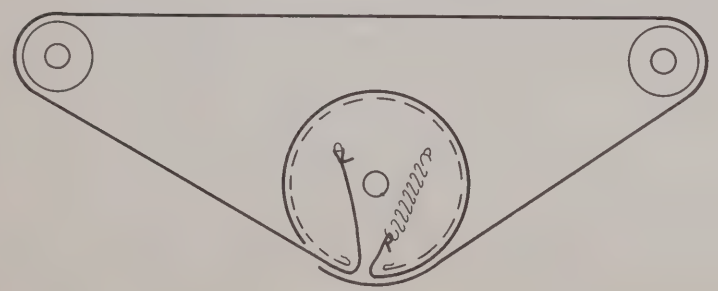
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA STEELMAN PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M2		† CR-55 or ♦ CR-55D and † CR-55LP or ♦ CR-55LPD	† C-449 or ♦ C-449D and † A-448 or ♦ A-448D	† W-64S or ♦ W-64D and † W-64MGS or ♦ W-64MGD	† Jewel ♦ Diamond

MISCELLANEOUS

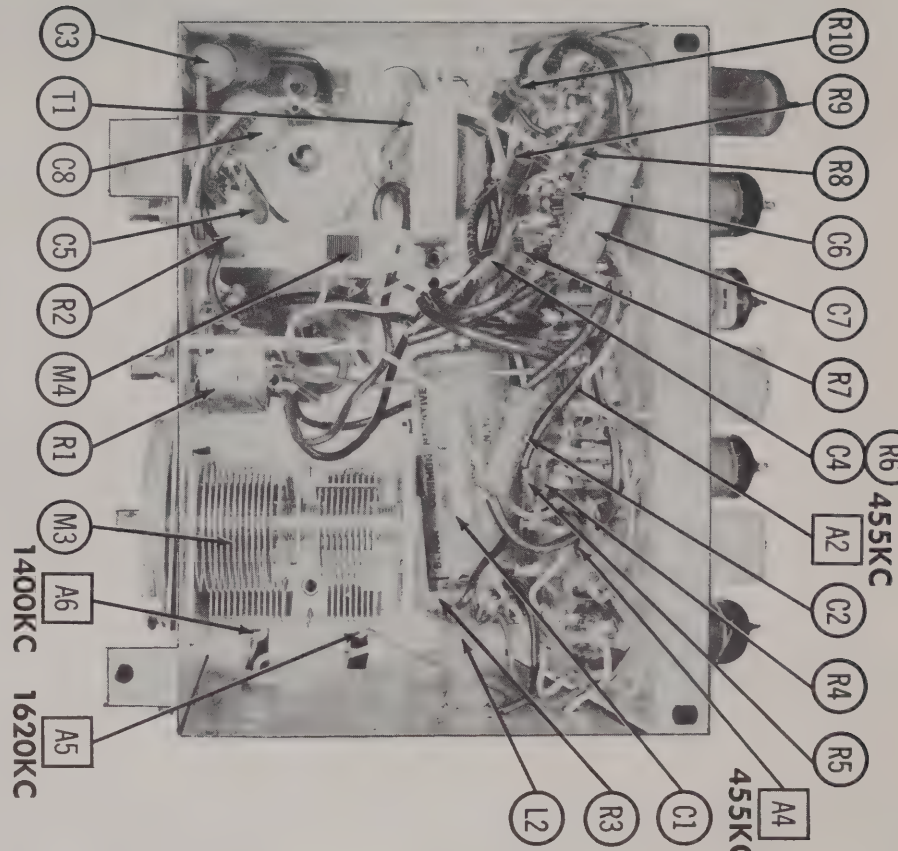
ITEM No.	PART NAME	STEELMAN PART No.	NOTES
M3	Tuning Cap.	CV72	2 Gang (34-475MMF, 28-195MMF)
M4	Switch		Radio-Phono (DPDT-Slide Type)

TUNING GANG FULLY CLOSED



DIAL CORD STRINGING

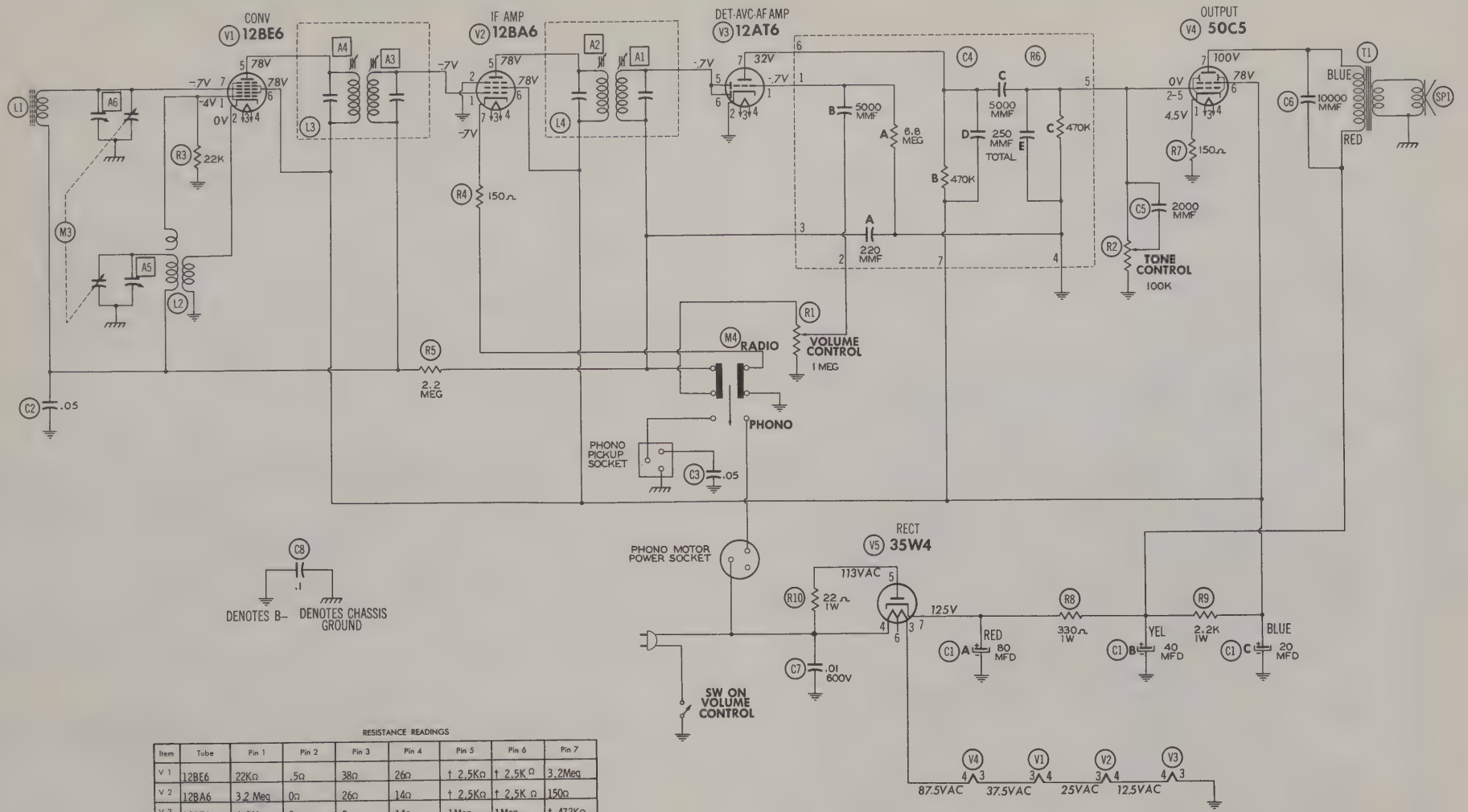
CHASSIS—BOTTOM VIEW



SET 322 FOLDER 13

STEELMAN Model 3A16U

STEELMAN Model 3A16U



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	38Ω	26Ω	† 2.5KΩ	† 2.5K Ω	3.2Meg
V 2	12BA6	3.2 Meg	0Ω	26Ω	14Ω	† 2.5KΩ	† 2.5K Ω	150Ω
V 3	12AT6	6.8Meg	0Ω	0Ω	14Ω	1Meg	1Meg	† 472KΩ
V 4	50C5	150Ω	90KΩ	38Ω	90Ω	90KΩ	† 2.5KΩ	† 550Ω
V 5	35W4	TP	TP	90Ω	130Ω	152Ω	NC	9KΩ

ALL MEASUREMENTS TAKEN IN RADIO POSITION.
† MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.
TP-TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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STROMBERG-CARLSON MODEL K21ATQ

TRADE NAME	Stromberg-Carlson	MODELS	CHASSIS
		K21AHB, K21AHCB, K21AHCE, K21AHCM, K21AHE, K21AHM, K21ATB, K21ATM, K21ATQ	KH-21A, KV-21A,
		K22AHB, K22AHCB, K22AHCE, K22AHCM, K22AHE, K22AHM, K22ATB, K22ATM, K22ATQ	KH-22A, KV-22A
MANUFACTURER	Stromberg-Carlson Co.-Service Dept., 1700 University Ave., Rochester 10, N.Y.		
TYPE SET	Television Receiver		
TUBES	Twenty		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.64 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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STROMBERG-CARLSON MODELS K21AHB, AHCB, AHCE, AHCM, AHE, AHM, ATB, ATM, ATQ (Ch. KH-21A, KV-21A), K22AHB, AHCB, AHCE, AHCM, AHE, AHM, ATB, ATM, ATO (Ch. KH-22A, KV-22A)

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STROMBERG-CARLSON MODELS K21AHB, AHCB, AHCE, AHCM, AHE, AHM, ATB, ATM, ATQ (Ch. KH-21A, KV-21A), K22AHB, AHCB, AHCE, AHCM, AHE, AHM, ATB, ATM, ATO (Ch. KH-22A, KV-22A)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.
2. Remove 6 wood screws. Remove rear cover.
3. Remove 4 chassis bolts. Remove chassis.

MODELS	CHASSIS
K21AHB, K21AHCB, K21AHCE, K21AHCM, K21AHE, K21AHM, K21ATB, K21ATM, K21ATQ	KH-21A, KV-21A
K22AHB, K22AHCB, K22AHCE, K22AHCM, K22AHE, K22AHM, K22ATB, K22ATM, K22ATQ	KH-22A, KV-22A

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 4 wood screws holding wooden molding at the top edge of the safety glass. Remove wooden molding and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit may be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal frequency slug (L24) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L22) located on top of the chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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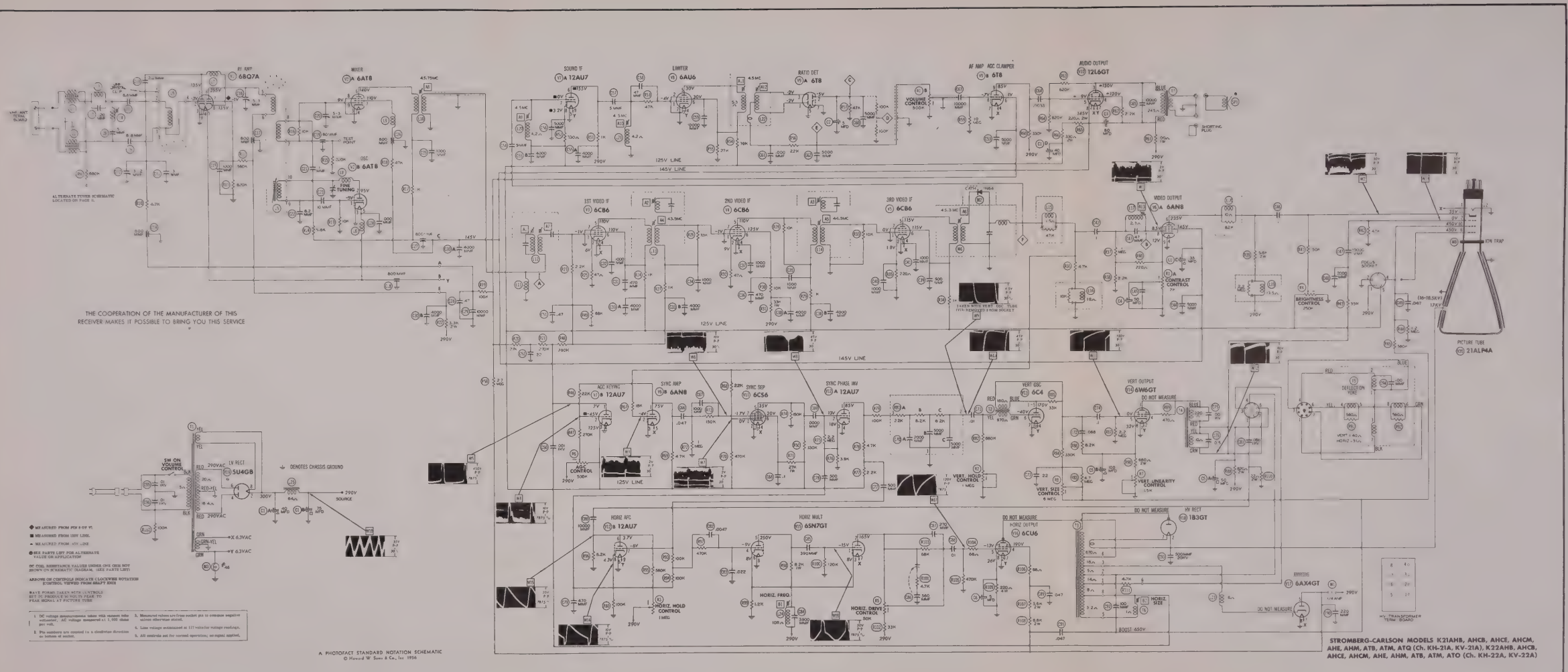

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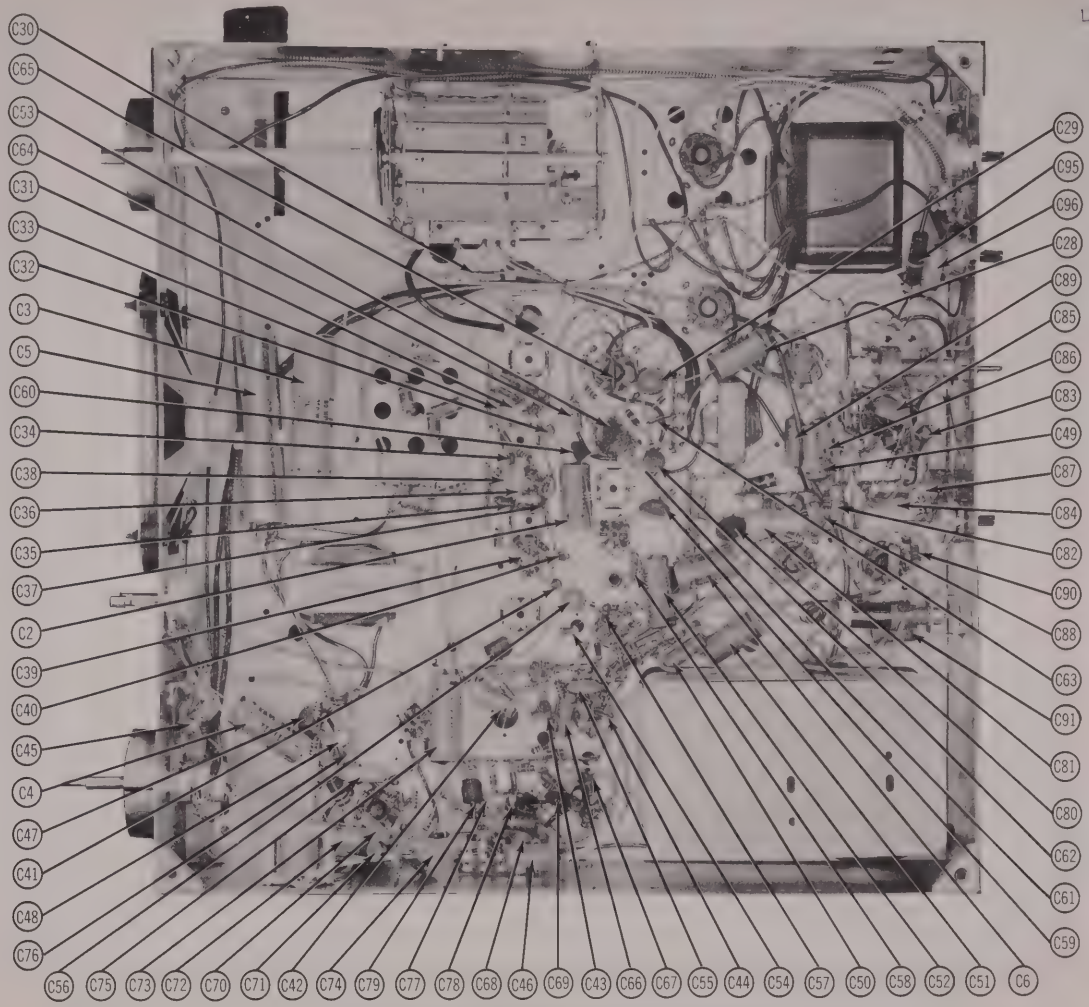
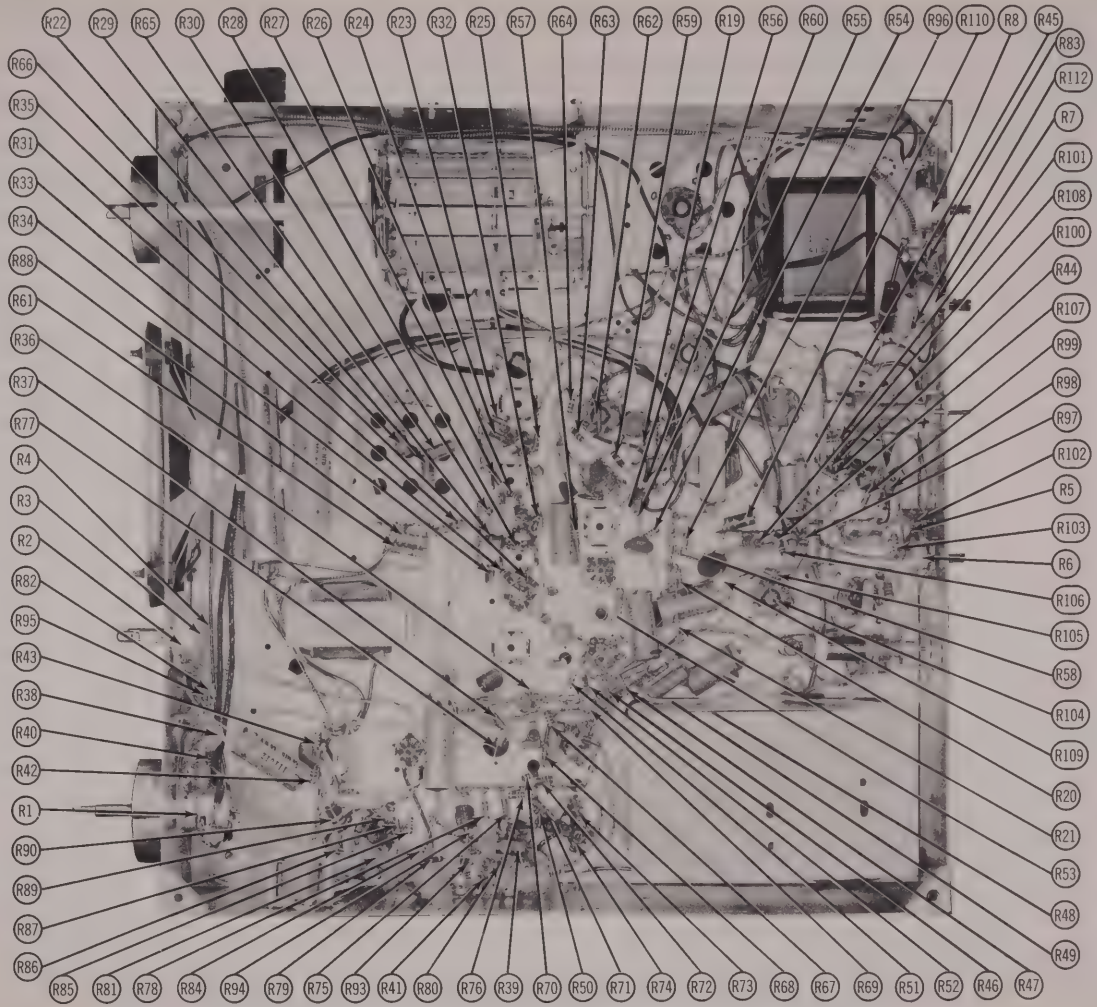
STROMBERG-CARLSON MODELS K21AHB, AHCB, AHCE, AHCM, AHE, AHM, ATB, ATM, ATQ (Ch. KH-21A, KV-21A), K22AHB, AHCB, AHCE, AHCM, AHE, AHM, ATB, ATM, ATO (Ch. KH-22A, KV-22A)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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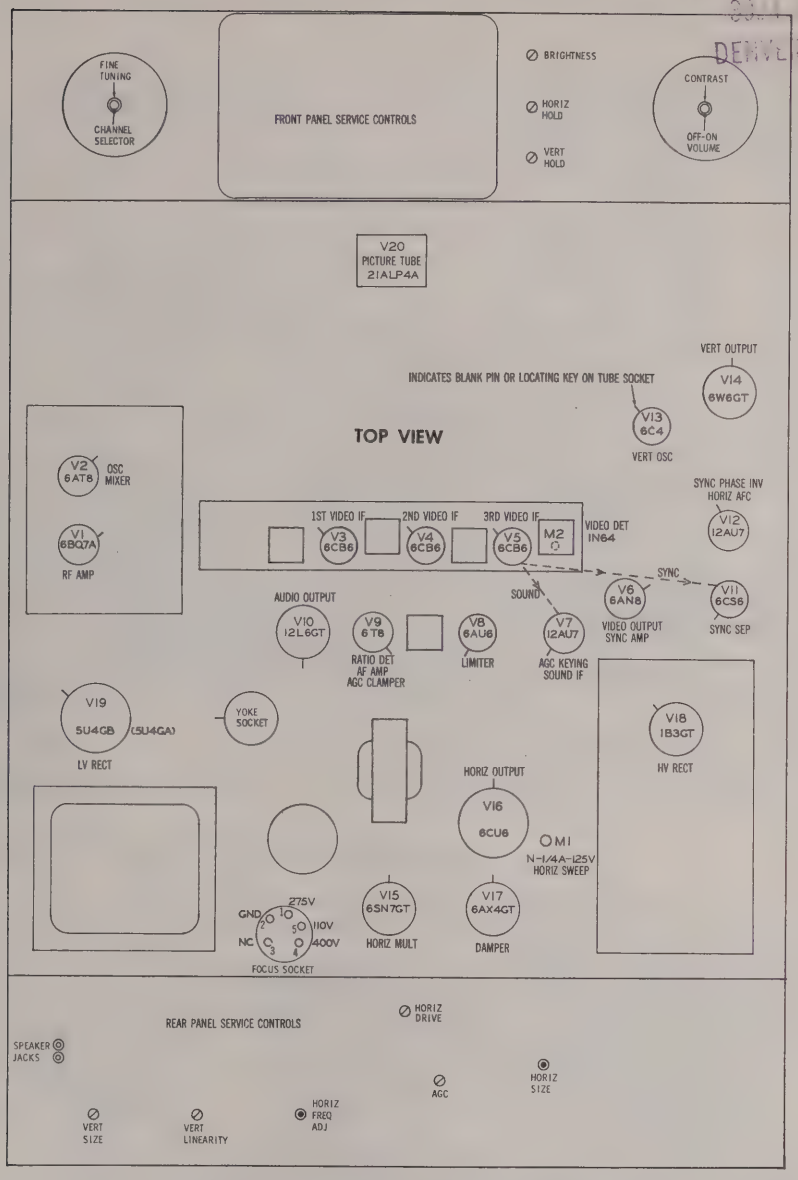
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V19**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V10**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V7, V20**
Has pic, no sound - **V7, V8, V9, V10**
Overloaded picture - **V7, V9**

SYNC FAILURE
No vert. sync - **V12, V13**
No horiz. sync - **V12, V15**
No vert. or horiz. sync - **V6, V11, V12**

SWEEP FAILURE
No raster, has sound - **V15, V16, V17, V18, V20, Fuse (M1)**
No vertical deflection - **V13, V14**
Poor vert. linearity or foldover - **V13, V14**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V18, V19**
Vert. off freq. - **V12, V13**
Horiz. off freq. - **V12, V15**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped away from the chassis. Do not remove the horizontal multivibrator tube (V15) to diable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt battery to the ungrounded side of C28. Connect the positive lead to chassis.
Attenuate the sweep generator output to maintain 2 volts peak to peak on the scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	100MMF	High side to point Ⓐ. Low side to chassis.	44.0MC (10MC Swp.)	39.75MC	Any non-interfering channel	Vert. amp. thru 47KΩ to point Ⓑ. Low side to chassis.	A1	Adjust to place marker in 39.75MC trap notch as in Fig. 1.
2.	"	"	"	41.25MC	"	"	A2	Adjust to place marker in 41.25MC trap notch as in Fig. 1.
3.	"	"	"	47.25MC	"	"	A3	Adjust to place marker in 47.25MC trap notch as in Fig. 1.
4.	"	"	Not used	43.5MC	"	Use VTVM DC probe thru 1Meg to point Ⓑ. Common to chassis.	A4	Attenuate generator to maintain not more than 1.5 volts on VTVM. Adjust for maximum deflection.
5.	"	"	"	44.5MC	"	"	A5	"
6.	"	"	"	45.3MC	"	"	A6	"
7.	"	"	44.0MC (10MC Swp.)	39.75MC 41.25MC 42.75MC 45.75MC 47.25MC	"	Vert. amp. thru 47KΩ to point Ⓑ. Low side to chassis.		Adjust for response curve similar to Fig. 1. If necessary, retouch A4 through A6 to obtain desired response. Use high scope gain and sweep generator output to observe trap regions. If necessary retouch A1 thru A3 for MINIMUM marker amplitude at 39.75MC, 41.25MC and 47.25MC.
8.	Direct	High side to ungrounded tube shield floating over converter tube. Low side to chassis.	"	42.75MC 45.75MC	"	"	A7, A8	Adjust for response similar to Fig. 2.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from pin 2 (plate) of 6T8 (V9) to chassis. The junction of these two resistors is alignment point Ⓓ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.01MFD	High side to point Ⓕ. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point Ⓓ. Common to chassis.	A9, A10, A11	Attenuate generator output to maintain 1.5 volts at VTVM. Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point Ⓔ. Common to point Ⓓ.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of correct setting. Remove resistors.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.01MFD	High side to point Ⓕ. Low side to chassis.	4.5MC (450KC Swp.)	4.5MC	Any non-interfering channel	Vert. amp. to point Ⓒ. Low side to chassis.	A9, A10, A11	Disconnect stabilizing capacitor (C2). Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
10.	"	"	"	"	"	Vert. amp. to point Ⓔ. Low side to chassis.	A12	Reconnect C2. Adjust so that 4.5MC marker occurs at the center of crossover lines as in Fig. 4. SLIGHTLY retouch A11 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	.01MFD	High side to point Ⓑ. Low side to chassis.	Not used	4.5MC (400∿ Mod.)	Any non-interfering channel	Vert. amp. thru detector (Fig. 5) to pin 11 (cathode) of picture tube. Low side to chassis.	A13	Adjust for MINIMUM 400∿ indication on scope.

TUNER ALIGNMENT

The tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be necessary.

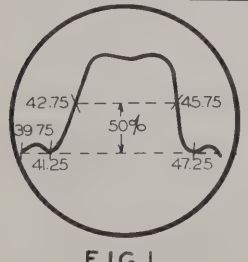


FIG.1

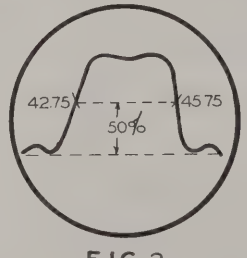


FIG.2

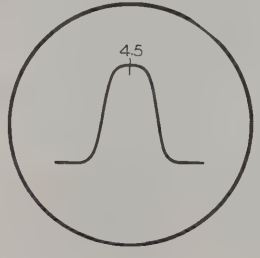


FIG.3

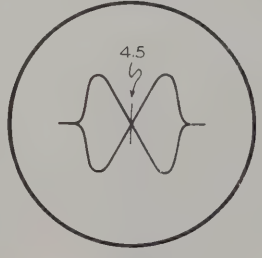


FIG.4

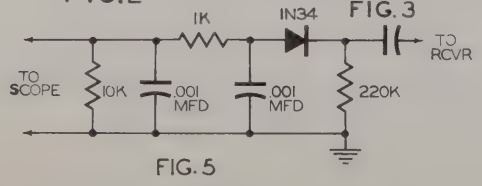
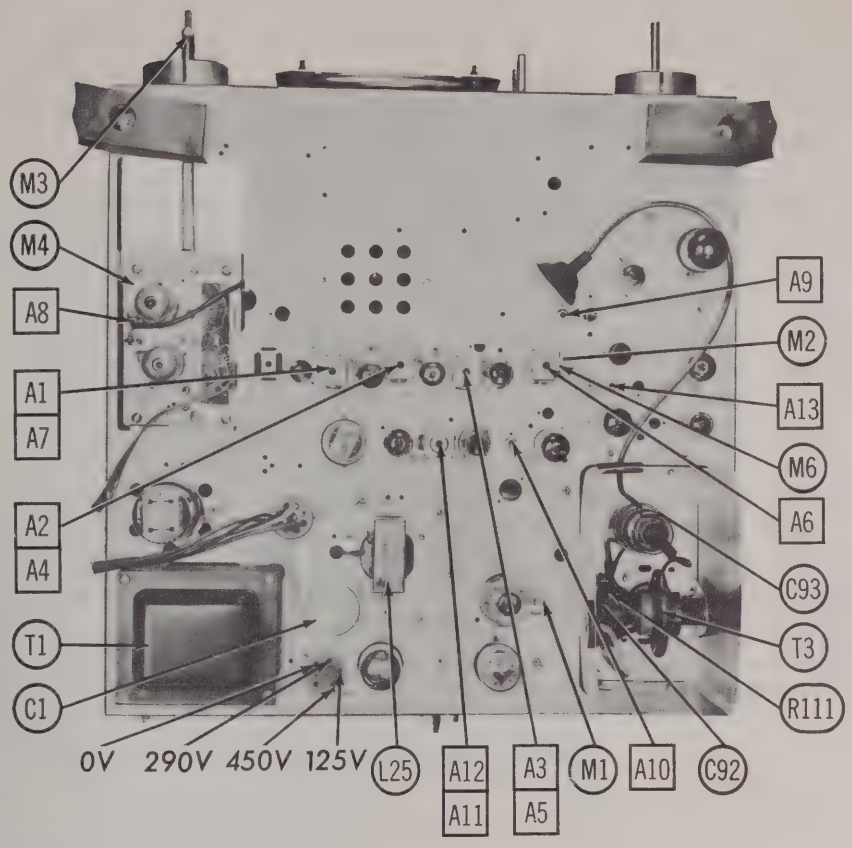
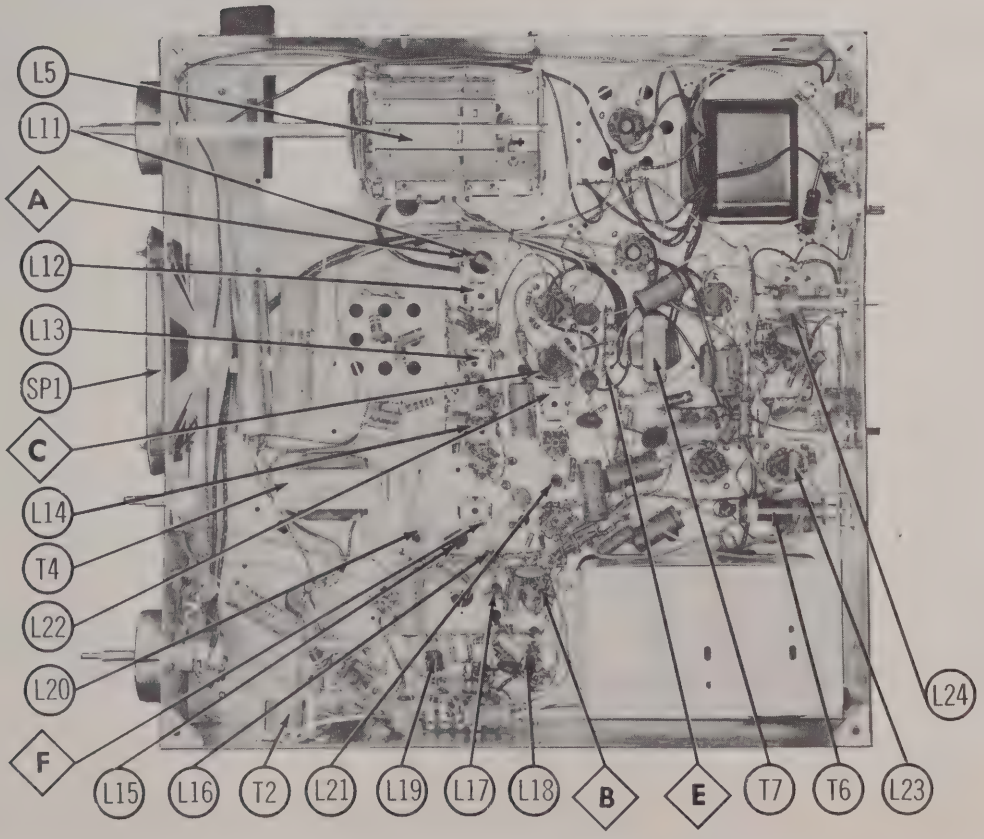


FIG.5



CHASSIS TOP VIEW

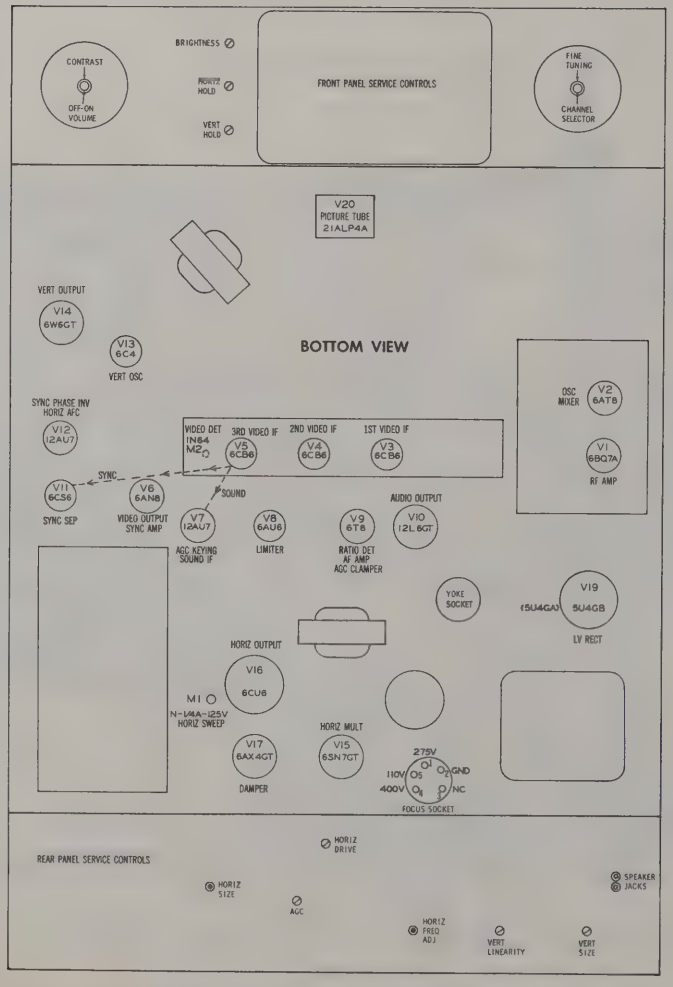


CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

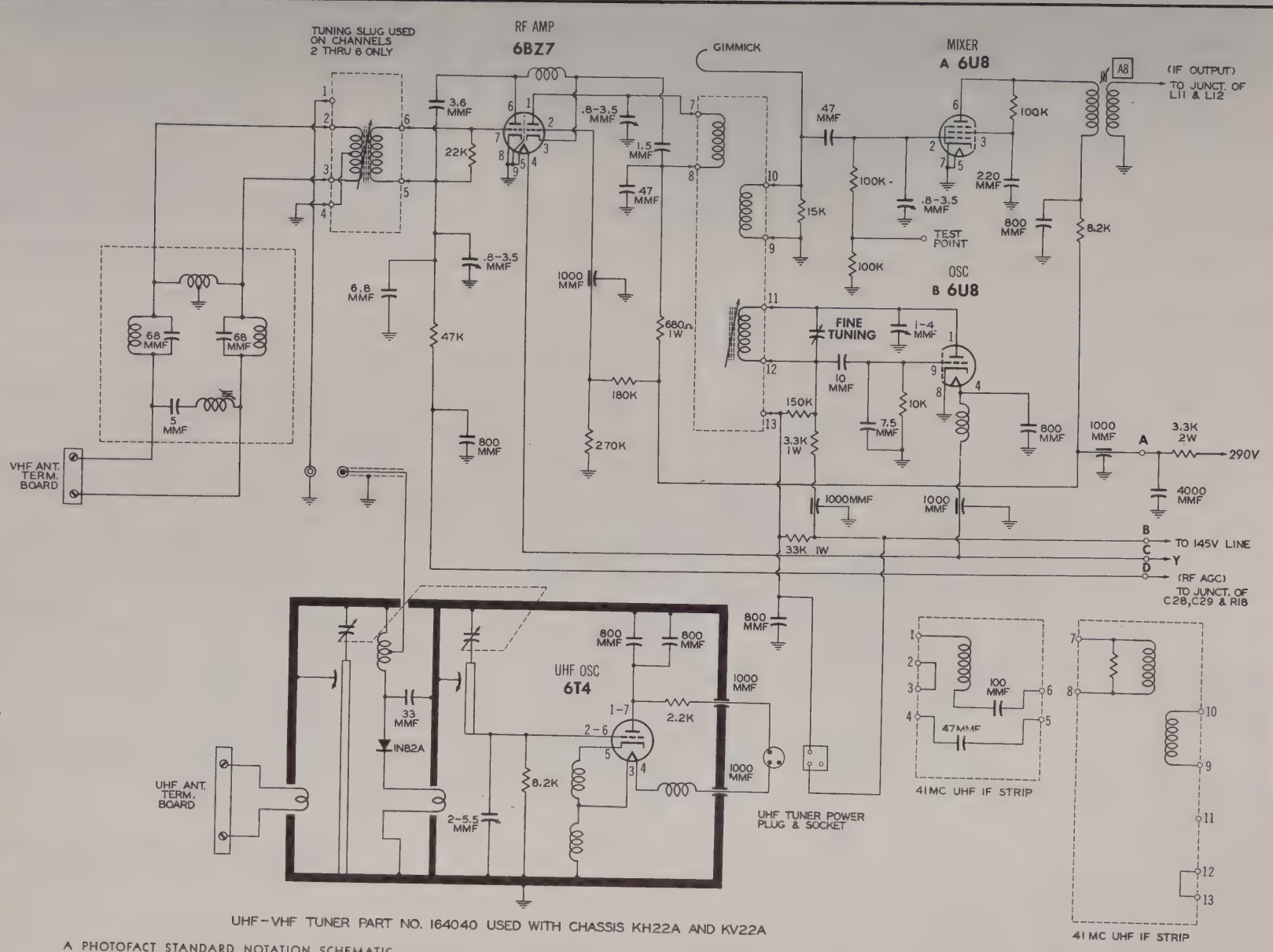
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	700KΩ	0Ω	0Ω	.1Ω	† 3.3KΩ	320KΩ	INF	0Ω
V 2	6AT8	10KΩ	■ 5.6KΩ	0Ω	0Ω	.1Ω	■ 1KΩ	■ 47KΩ	0Ω	220KΩ
V 3	6CB6	70KΩ	47Ω	0Ω	.1Ω	■ 1.5KΩ	■ 1.5KΩ	0Ω		
V 4	6CB6	70KΩ	47Ω	0Ω	.1Ω	■ 1.5KΩ	† 45KΩ	0Ω		
V 5	6CB6	.2Ω	220Ω	0Ω	.1Ω	■ 1.5KΩ	■ 1.5KΩ	0Ω		
V 6	6AN8	■ 5.2KΩ	22KΩ	0Ω	0Ω	.1Ω	† 5.6KΩ	40KΩ	1Meg	1KΩ
V 7	12AU7	450KΩ	■ 27KΩ	40KΩ	0Ω	0Ω	† 1KΩ	■ 550Ω	■ 880Ω	.1Ω
V 8	6AU6	47KΩ	0Ω	0Ω	.1Ω	■ 30KΩ	■ 30KΩ	0Ω		
V 9	6T8	300KΩ	47KΩ	300KΩ	.1Ω	0Ω	600KΩ	0Ω	10Meg	† 330KΩ
V 10	12L6GT	NC	.1Ω	† 400Ω	† 2.3KΩ	400KΩ	TP	.1Ω	40KΩ	
V 11	6CS6	27KΩ	0Ω	0Ω	.1Ω	■ 130KΩ	■ 27KΩ	1Meg		
V 12	12AU7	■ 7.5KΩ	2.2Meg	3.9KΩ	0Ω	0Ω	8.2KΩ	300KΩ	100KΩ	.1Ω
V 13	6C4	▲ 2Meg	NC	0Ω	.1Ω	▲ 2Meg	1Meg	0Ω		
V 14	6W6GT	NC	.1Ω	† 1.1KΩ	† 1.5KΩ	2.2Meg	NC	0Ω	1.2KΩ	
V 15	6SN7GT	120KΩ	† 70KΩ	1.2KΩ	700KΩ	† 8.3KΩ	1.2KΩ	.1Ω	0Ω	
V 16	6CU6	NC	0Ω	TP	† 13KΩ	470KΩ	NC	.1Ω	220Ω	TOP CAP ▲ 20Ω
V 17	6AX4GT	NC	NC	1.7Meg	NC	† 64Ω	TP	.1Ω	0Ω	
V 18	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 690Ω
V 19	5U4GB	NC	100KΩ	NC	18Ω	NC	20Ω	NC	100KΩ	
V 20	21ALP4A	.1Ω	47KΩ	PIN 6 ▲ 560KΩ	PIN 10 ▲ 560KΩ	PIN 11 ■ 200K	PIN 12 0Ω			

† MEASURED FROM PIN 2 OF V19.
■ MEASURED FROM 145V LINE.
▲ MEASURED FROM PIN 3 OF V17.
NC-NO CONNECTION.
TP-TIE POINT.



TUBE PLACEMENT CHART



UHF-VHF TUNER PART NO. 164040 USED WITH CHASSIS KH22A AND KV22A

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE VHF-UHF TUNER SCHEMATIC

PROPERTY OF
E.T. ... SHOP
... ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: Stromberg-Carlson PART No.	STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6DQ7A	6DQ7A	
V2	Mixer-Oscillator	6A7S	6A7S	
V3	1st. Video IF Amplifier	6CB6	6CB6	
V4	2nd. Video IF Amplifier	6CB6	6CB6	
V5a	3rd. Video IF Amplifier	6CB6	6CB6	
V6	Video Output-Sync Amplifier	6AN8	6AN8	
V7	Sound IF-AGC Keying	12AU7	12AU7	
V8	Limiter	6AU6	6AU6	
V9	Ratio Detector-AF Amplifier-AGC Clamper	6T8	6T8	
V10	Audio Output	12L6GT	12L6GT	
V11	Sync Separator	6CS6	6CS6	
V12	Sync Phase Inverter-Horiz AFC	12AU7	12AU7	
V13	Vert Oscillator	6C4	6C4	
V14	Vert. Output	6W6GT	6W6GT	
V15	Horiz. Mult.	6SN7GT	6SN7GT	
V16	Horiz. Output	6CU6	6CU6	
V17	Damper	6AX4GT	6AX4GT	
V18	HV Rectifier	1B3GT	1B3GT	
V19	LV Rectifier	5U4GB	5U4GB	A 5U4GA may be used as an alternate

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Stromberg-Carlson	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V20	21ALP4A ①	21ALP4A ① 21ALP4A B ①	21ALP4A/B ② B ②	① Aluminized ② Silver screen "85"
		21ALP4B ①		
		21ALP4		

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP	VOLT	REPLACEMENT DATA: Stromberg-Carlson PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	±40	400	111J31	RE1035				Q-325	R2306
B	±75	400			FP377 TC80			MT-4540	
C	±35	200							
D	±40	200							
C2	5	50	111095	PRS150V4	BR550	TC30	TD-5-50	MMT-0505	TVA-1303
C3	80	250	111J10	PRS450V80	BR9045	TC80	TD-80-450	S-155	TVA-1716
C4	50	450	111J13	PRS50V50	BR505	TC39	TD-50-50	FM-0650	TVA-1308
C5A	±50	400	111J33	AFH2-90-50	C104	FP329.5	T-735	TM-3056	TVL-2653
B	±100	50							
C5	5	50	111095	PRS150V4	BR550	TC30	TD-5-50	MMT-0505	TVA-1303

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP	VOLT	REPLACEMENT DATA: Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C7	120			DE-121		811-121				
C8	5			NPO-D15	TCZ-5	Z01	NPOA-050	Z7-555	57CCB-V47	
C9	6.8			NPO-D15.8	TCZ-6R8	Z012	NPOA-6R8	Z7-5568	57CCB-V68	
C10	6.8			NPO-D15.8	TCZ-6R8	Z013	NPOA-6R8	Z7-5568	57CCB-V68	
C11	3			NPO-D03	TCZ-3R3	Z007	NPOA-030	Z7-553	57CCB-V33	
C12	3-12									
C13	2.2			NPO-S2.2	TCZ-2R2	Z006	NPOA-2R2		57CCB-V22	
C14	200									
C15	1000			BPD-001	DD-102	KD69	811-102	DC-531	5HK-D1	
C16	3-3				829-3		3115-01-0R5	CT565A		
C17	800									
C18	800									
C19	60									
C20	5-3				829-3		3115-01-0R5	CT565A	57CCB-V1	
C21	1			NP0-S11	TCZ-1		NPOA-010			
C22	6 2									
C23	10									
C24	1000			BPD-001	DD-102	KD69	811-102	DC-531	5HK-D1	
C25	1000			BPD-001	DD-102	KD69	811-102	DC-531	5HK-D1	
C26	800									
C27	800									
C28	47	200	110709	P2S8N-47		CUSB24F7		PT4047	57M-P47	
C29	10000		110672	BPD-01	DD-103	KD83	811-01	DC-511	5HK-E1	
C30A	4000		110685	BPD-2X004		DK078	822-004	DCD-524	5HK-2D4	
B	4000									
C31	470		110464	1484-00047	DE-471	SR574			MS-347	
C32	1000		110634	BPD-001	DD-102	KD69	801-001	DC-531	5HK-D1	
C33A	4000		110685	BPD-2X004		DK078	822-004	DCD-524	5HK-2D4	
B	4000									
C34	1000		110634	BPD-001	DD-102	KD69	801-001	DC-531	5HK-D1	
C35	1000		110634	BPD-001	DD-102	KD69	801-001	DC-531	5HK-D1	
C36	470		110464	1484-00047	DE-471	SR574			MS-347	
C37	1000		110634	BPD-001	DD-102	KD69	801-001	DC-531	5HK-D1	
C38A	4000		110685	BPD-2X004		DK078	822-004	DCD-524	5HK-2D4	
B	4000									
C39	500		110464	1484-00047	DE-501	SR576		MC3245	MS-35	
C40	1000		110634	BPD-001	DD-102	KD69	801-001	DC-531	5HK-D1	
C41	1000		110634	BPD-001	DD-102	KD69	801-001	DC-531	5HK-D1	
C42	1	200	110705	P2S8N-1	DF-104	CUSB2P1		PT401	57M-P1	
C43	47			NPO-S147	TCZ-47	TZ33	NPO-338-470	Z7-5647	57CC-Q47	
C44	5000		101586	BPD-005	DD-502	KD80	811-005	DC-535	5HK-D5	
C45	1	200	110705	P2S8N-1	DF-104	CUSB2P1		PT401	57M-P1	
C46	1	400	110734	P4S8N-1	DF-104	CUSB4P1		PT401	47M-P1	
C47	10000		110672	BPD-01	DD-103	KD83	811-01	DC-511	5HK-E1	
C48	2000		110540	BPD-02	DD-203	K072	801-063	DC-523	5HK-D2	
C49	047	400	110741	BPD-05	DF-503	CUSB4S7		PT4147	47M-S47	
C50	001	1000	110563	BYD-15-1000	DD5B-103	CUSB3D1		PT3D1	M3-B1	
C51	47	200	110709	P2S8N-47		CUSB2P47		PT4047	57M-P47	
C52	23	400	110726	P4S8N-23		CUSB4P23		PT4023	47M-P23	
C53	5000		101586	BPD-005	DD-503	KD80	811-005	DC-535	5HK-D5	
C54	5		110598	NP0-S15	DE-050	TZ07	NPOA-050	Z7-555	57CCB-V47	
C55A	4000		110685	BPD-2X004		DK078	822-004	DCD-524	5HK-2D4	
B	4000									
C56	5000		101586	BPD-005	DD-502	KD80	811-005	DC-535	5HK-D5	
C57	5		110598	NP0-S15	DE-050	TZ07	NPOA-050	Z7-555	57CCB-V47	
C58	47		110402	NP0-S147	DE-470	TZ33	NPO-338-470	Z7-5647	57CC-Q47	
C59	10000		110672	BPD-01	DD-103	KD83	811-01	DC-511	5HK-E1	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C60	5000		110586	BPD-005	DD-503	K080	811-005	DC-535	5HK-D5	
C61	1000		110634	BPD-001	DD-103	K069	801-001	DC-531	5HK-D1	
C62	5000		110586	BPD-005	DD-503	K080	811-005	DC-535	5HK-D5	
C63	10000		110672	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C64	.0033	400	110718	BPD-0033	DE-332	CUSD33	GP3-333-332	PT3323	67M-D33	
C65	10000		110672	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C66	.047	400	110722	BPD-05	DF-503	CUSD4S47		PT4147	47M-S47	
C67	1000		110634	BPD-001	DD-103	K069	801-001	DC-531	5HK-D1	
C68	.1	400	110724	P4S8N-1	DF-104	CUSB4P1		PT401	47M-P1	
C69	10000		110672	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C70A	2000							DC-522		
B	5000		†133B300	†PA-U10	†PC-100	†U5TMG	†145-01	DC-525	†V-1	
C	5000							DC-525		
C71	.01	400	110718	BPD-01	DE-103	CUSB4P1	GP3-333-103	PT411	47M-S1	
C72	.068	600	110743	P6S8N-068		CUSB6S8			S7M-S68	
C73	.33	600	110745	P6S8N-33		CUSB6P22		PT6033	67M-P33	
C74	.1	600	110743	P6S8K-1	DF-104	CUSB6P1		PT601	67M-P1	
C75	.001	1000	110563	BYD-15-1000	DE-102	CUSB4D1		PT3E01	107M-D1	
C76	.015	400	110719	BPD-015	DD5B-153	CUSB4S15		PT6153	47M-S15	
C77	500		110464	1464-00047	DE-501	SR575		MC3245	MS-35	
C78	500		110464	1464-00047	DE-501	SR575		MC3245	MS-35	
C79	500		110464	1464-00047	DE-471	SR574?	GP3K-471	MC3245	MS-347	
C80	10000		110672	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C81	.068	1000	110573	P10S8N-068					107M-S68	
C82	.0047	400	110718	BPD-0047	DE-472	CUSB5D47	GP2-333-472	PT6247	57M-D47	
C83	.033	400	110701	BPD-03	DF-303	CUSB4S33		PT4333	47M-S33	
C84	3900	500	110309	1467-0039		1RSD39			M5-339	
C85	390	500	110263			1RS739			M5-339	
C86	560	500	110364	1464-00056		1R6756			M5-356	
C87	370	500	110308	1469-00027	TCZ-370	1RS737	GP3K-371	UC-5327	M5-337	
C88	.01	400	110718	BPD-01	DE-103	CUSB4E1	GP3-333-103	PT411	47M-S1	
C89	.047	400	110722	BPD-05	DF-503	CUSB4S47		PT4147	47M-S47	
C90	230		110453	1466-00022	DE-231	1RS5732	GP3K-231	UC-5323	47M-S47	
C91	.047	400	110722	BPD-05	DF-503	CUSB4S47		PT4147	47M-S47	
C92	100		110947	BYD-10-100	DD5D-101	V37I	2KV-101	DC3031	30GA-T1	
C93	2000	20000	110630	UV-503		MU3D25		UV-30035A	20GK-T5	
C94	100			BYD-10-100	DD5D-101	V37I	2KV-101	DC3031	30GA-T1	
C95	.01	1000	110943	BYD-15-1000	DD5E-103	CUSB5E1		PT5E01	M5-B1	
C96	.01	2000	110943	BYD-15-1000	DD5E-103	CUSB5E1		PT5E01	M5-B1	

† Items C70A, C70B, C70C, R81A, R81B and R81C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESIST-ANCE	WATTS	REPLACEMENT DATA: Stromberg-Carlson PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2000Ω	½	145184	PT-10	R7V-474	* Q1-30	UF33D	Contrast (Panel)
B	500KΩ	½		R2-41			UR55A ††	Volume (Rear)
C	Switch			KB-1			UR-26	Attach to R1B.
R2A	1Meg	½	145180	AB-69	A47-1Meg-S	Q11-137	TA16L	Vert. Hold
B	Shaft		Not Req.	AK-4	KS6-3	Not Req.	Not Req.	Attach to R2A.
R3A	1Meg	½	145180	AB-69	A47-1Meg-S	Q11-137	TA16L	Horiz. Hold
B	Shaft		Not Req.	AK-4	KS6-3	Not Req.	Not Req.	Attach to R3A.
R4A	250KΩ	½	145157	AB-50	A47-250K-S	Q11-130	TA256L	Brightness
B	Shaft		Not Req.	AK-4	KS6-3	Not Req.	Not Req.	Attach to R4A.
R5A	50KΩ	½	145195	AB-31	A47-50K-S	Q11-123	PTA54L	Horiz. Drive
B	Shaft		Not Req.	AK-1	FK8-1	SQ	Not Req.	Attach to R5A.
R6A	500KΩ	½	145163	AB-59	A47-500K-S	Q11-133	TA55L	AGC
B	Shaft		Not Req.	Not Req.	FK8-1	SQ	Not Req.	Attach to R6A.
R7A	1500Ω	½	145195	AB-8	A47-1500-S	Q11-109	PTA-1531L	Linearity
B	Shaft		Not Req.	AK-1	FK8-1	SQ	Not Req.	Attach to R7A.
R8A	6Meg	½	145159	AB-87	A47-1.6Meg-S	Q11-142	U-82	Vert. Size
B	Shaft		Not Req.	AK-4	FK8-1	SQ	Not Req.	Attach to R8A.

* Concentrikit Equivalent; K-2 Kit, Base Elements & Shafts; R17-110, P1-126 (Panel)
R13-113, R2-216 (Rear)
T6-1 (Switch)

† Universal Replacement (Mallory Exact Duplicate Part No. UF-22IS).

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: Stromberg-Carlson PART No.	IRC PART No.	NOTES
R9	680Ω	½		BTS-680K	
R10	4700Ω	½		BTS-4700	
R11	820KΩ	½		BTS-820K	
R12	560KΩ	½		BTS-560K	
R13	10KΩ	½		BTS-10K	
R14	5600Ω	½		BTS-5600	
R15	220KΩ	½		BTS-220K	
R16	10KΩ	½		BTS-10K	
R17	1000Ω	½		BTS-1000	
R18	47KΩ	½		BTS-47K	
R19	100KΩ	½	149113	BTS-100K	
R20	27KΩ	½	28174	BTS-27K	
R21	270KΩ	½	28184	BTS-270K	
R22	2200Ω	2	149079	BTS-2200	
R23	2200Ω	2	28162	BTS-2200	
R24	1000Ω	2	149081	BTS-1000	
R25	47Ω	½	28142	BTS-47	
R26	33KΩ	½	28176		
R27	1000Ω	½	149081	BTS-1000	
R28	10KΩ	½	28170		
R29	1000Ω	½	149081	BTS-1000	
R30	10KΩ	½	149107		
R31	33KΩ	½	149404	BTA-33K	
R32	47Ω	½	28142	BTS-47	
R33	10KΩ	½	28170		
R34	1000Ω	½	149081	BTS-1000	
R35	220Ω	½	28150	BTS-220	
R36	4700Ω	½	28166	BTS-4700	
R37	1Meg	½	149113	BTS-1Meg	
R38	2200Ω	½	28162	BTS-2200	
R39	1000Ω	½	149081	BTS-1000	
R40	220Ω	½	28150	BTS-220	
R41	150KΩ	½	149398	BTS-150K	
R43	47KΩ	½	28177	BTS-47K	
R43	33KΩ	½	28176	BTS-33K	
R44	1.2Meg	½	28193	BTS-1.2Meg	
R45	560KΩ	½	28185	BTS-560K	
R46	22KΩ	½	149394	BTS-22K	
R47	470KΩ	½	28184	BTS-470K	
R48	390KΩ	½	28186	BTS-390K	
R49	68KΩ	½	28179	BTS-68K	
R50	330KΩ	½	28183	BTS-330K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: Stromberg-Carlson PART No.	IRC PART No.	NOTES
R51	1000Ω	½	28155	BTS-1000	
R52	330Ω	½	149097	BTS-330	
R53	47KΩ	½	149111	BTS-47K	
R54	39KΩ	½	28176	BTS-39K	
R55	27KΩ	½	28174	BTS-27K	
R56	22KΩ	½	149109	BTS-22K	
R57	47KΩ	½	149111	BTS-47K	
R58	2.7Meg	½	28196	BTS-2.7Meg	
R59	10Meg	½	149125	BTS-10Meg	
R60	330KΩ	½	149116	BTS-330K	
R61	100Ω	½	149187	BTA-100	
R62	2300Ω	½	149103	BTS-2300	
R63	820KΩ	½	28190	BTS-820K	
R64	820KΩ	½	28190	BTS-820K	
R65	220Ω	2	149038	BTB-220	
R66	330Ω	2	149040	BTB-330	
R67	18KΩ	½	28173	BTS-18K	
R68	33KΩ	½	149394	BTS-33K	
R69	4700Ω	½	28166	BTS-4700	
R70	470KΩ	½	149417	BTS-470K	
R71	27KΩ	½	149405	BTA-27K	
R72	1Meg	½	149113	BTS-1Meg	
R73	150KΩ	½	149114	BTS-150K	
R74	150KΩ	½	149398	BTS-150K	
R75	2.5Meg	½	149121	BTS-2.5Meg	
R76	3900Ω	½	28165	BTS-3900	
R77	2200Ω	½	28163	BTS-2200	
R78	4700Ω	½	28166	BTS-4700	
R79	100KΩ	½	149115	BTS-100K	
R80	100KΩ	½	149395	BTS-100K	
R81A	22KΩ	½		BTS-22K	
B	8200Ω	½	† 128200	BTS-8200	
C	8200Ω	½		BTS-8200	
R82	680KΩ	½	28189	BTS-680K	
R83	4.7Meg	½	149123	BTS-4.7Meg	
R84	330KΩ	½	149116	BTS-330K	
R85	15KΩ	½	28175	BTS-15K	
R86	8200Ω	½	28169	BTS-8200	
R87	2.2Meg	½	149121	BTS-2.2Meg	
R88	620Ω	2	149043	BTB-620	
R89	470Ω	2	149099	BTS-470	
R90	680Ω	2	149042	BTB-680	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: Stromberg-Carlson PART No.	IRC PART No.	NOTES
R91	5800Ω	½		28176	
R92	680Ω	½		28179	
R93	100KΩ	1	149395	149094	
R94	100KΩ	1	149395	149117	
R95	5600KΩ	1	28188	149094	
R96	82000Ω	1	28159	149052	
R97	470KΩ	1	149417	149053	
R98	8200Ω	1	149401	149512	
R99	12000Ω	1	28159	149027	
R100	120KΩ	2	28181	149105	
R101	4700Ω	1	28166	149115	BTS-100K

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: Stromberg-Carlson PART No.	IRC PART No.	NOTES
R102	33KΩ	½		28176	
R103	68KΩ	½		28179	
R104	68Ω	1	149094		
R105	470KΩ	1	149417		
R106	68Ω	1	149094		
R107	68Ω	1	149052		
R108	6800Ω	2	149053		
R109	220Ω	4	149512		
R110	22Ω	2	149027		
R1U	4700Ω	1	149105		
R102	100KΩ	1	149115	BTS-100K	

† Items R81A, R81B, R81C, C70A, C70B, C70C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA: Stromberg-Carlson PART No.	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	117VAC	550VCT	5V	12.6V	161451	P9739 ②	P9076 ②		26R33 ①	R-61BC ②
		a 1.64A	a .220A	a 3A					a 5.3A	

① Tape low HV winding.
② Connect in series and phase 6.3V winding.
③ Drill new mounting holes.
④ Tape 6.3V ③ & 1.2A winding.
⑤ Tape 5V ③ 3A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: Stromberg-Carlson PART No	Halldorson PART No	Merit PART No	RCA PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Vert. Osc. Trans.	161289	B8702	A-3003	30V11 ①	V405	A-8125	26A03	A-97X
T3	Horiz. Output Trans.	161286 ②		HVO-54 *		X-139 *	A-8256 *	FLY-76 *	D-49 * ①
T4	Vert. Output Trans.	161288	Z1900 ③	A-2823		V307	A-8142 ①	26B72	A-108X
T5A	Yoke(90°)Horiz.(23MB)	114786	DF807 ④	MDF-92	23SD1 ④	Y90F19A3	DY-16A ④	Y-16 ④ ⑤	T-41-1 ④
B	Vert.(40MB)		⑤	⑤		⑤	⑤		⑤
T8	Horiz. Size Coil (1.5 to 1	161461	RF800 ③	MWC-6	21R81 ①	20LR15 ①	WC-8	WC-12 ①	WC-13 ①
				9.5MH)					

① Drill new mounting hole[s].
② Part of HI-voltage assembly #152166 (KH-21A and KH-22A); #152169 (KV-21A, KV-22A).
③ Use 8 to 1 uterus ratio.
④ Use original rear cover and centering device.
⑤ Use original horizontal damping network.
⑥ Use terminals #3 and #4.
⑦ Use red and blue terminals.

***HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA**

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4	5	5	5	5	5	5
3	4	4	4	4	4	4
2	1	1	1	1	1	1
1	No-Core Note ⑥	No-Core Note ⑥	No-Core Note ⑥	No-Core Note ⑥	No-Core Note ⑥	No-Core Note ⑥
8	2	2	2	2	2	2
5	1	1	1	1	1	1
Special Notes	⑦	⑦	⑦	⑦	⑦	⑦

⑥ If necessary to reduce yoke "ringing" connect resistor R111 in series with capacitor C94 across horizontal yoke terminals #2 and #1.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI	SEC	REPLACEMENT DATA: Stromberg-Carlson PART No.	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T7	1.92KΩ	3-4Ω	161285	21101	A2928	A3876	24S50	S-2X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: Stromberg-Carlson PART No.	RCA TYPE No	NOTES
SP1	4"x 6"	PM	3-4Ω	155911	4A407	24S82	1 Used in some versions.
	6"x 9"	PM	3-4Ω	155918 1	6A2	23S81	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Stromberg-Carlson PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω					
L2	Ant. Matching Trans.	0Ω	0Ω					
L3	FM Trap	0Ω						
L4	IF Trap	.2Ω						
L5A	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172302				Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172303				Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172304				Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172305				Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172306				Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172307				Channel 7

STROMBERG-CARLSON MODELS K21AHB, AHCB, AHCE, AHCF, AHM, ATB, ATM, ATQ (Ch. KH-21A, KV-21A), K22AHB, AHCB, AHCE, AHCM, AHE, AHM, ATB, ATM, ATO (Ch. KH-22A, KV-22A)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Stromberg-Carlson PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172208				Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172209				Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172210				Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172211				Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172212				Channel 12
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		172213				Channel 13
L6	Fil. Choke	0Ω						
L7	Neut. Coil	0Ω						
L8	RF Coil	0Ω						
L9	RF Coil	0Ω						
L10	Conv. Plate	.2Ω	0Ω					
L11	RF Choke	.41Ω		114793	19-1000		4602	1 Microhenry; IRC Part No. CL-1
L12	1st Video IF			114455				Includes 39.75MC Trap
L13	2nd Video IF	.2Ω	.2Ω	114456	17-5002	TV-127	6232	Includes 41.25MC Trap
L14	3rd Video IF	.2Ω	.2Ω	114457	17-5003	TV-128	6233	Includes 47.25MC Trap
L15	Series Peaking Coil	11.5Ω		114790	19-3250 *	TV-185 *	6130 *	266 Microhenries; Wound on 47KΩ resistor
L16	Shunt Peaking Coil	19Ω		114798	19-3660 ■		6148 ■	670 Microhenries; Wound on 10KΩ resistor
L17	4.5MC Trap	2.3Ω		114417	20-1004	TV-151	1469	
L18	Series Peaking Coil	10Ω		114792	19-3201 ▲		6154 ▲	200 Microhenries; Wound on 82KΩ resistor
L19	Shunt Peaking Coil	13.5Ω		114794	19-4400 ●		6134 ●	395 Microhenries; Wound on 2.2Meg
L20	1st Sound IF	4.2Ω		114419			1470	
L21	2nd Sound IF	4.2Ω		114419			1470	
L22	Ratio Det.	5.3Ω	.8ΩCT	114418	17-3497	TV-115	6205	Tertiary Winding=.8Ω
L23	RF Choke	1.8Ω		114693	19-1002		4606	2.2Microhenries; IRC Part No. CLA

* Parallel with 47KΩ resistor.
■ Parallel with 10KΩ resistor.
▲ Parallel with 82KΩ resistor.
● Parallel with 2.2Meg resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Stromberg-Carlson PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L24	108Ω		114132	19-1576	TV-163	6210			HS-5	

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L25	.220A	64Ω	1.5HY	161051	C5040	C2994	C2327	26C41	C-21X

FUSES

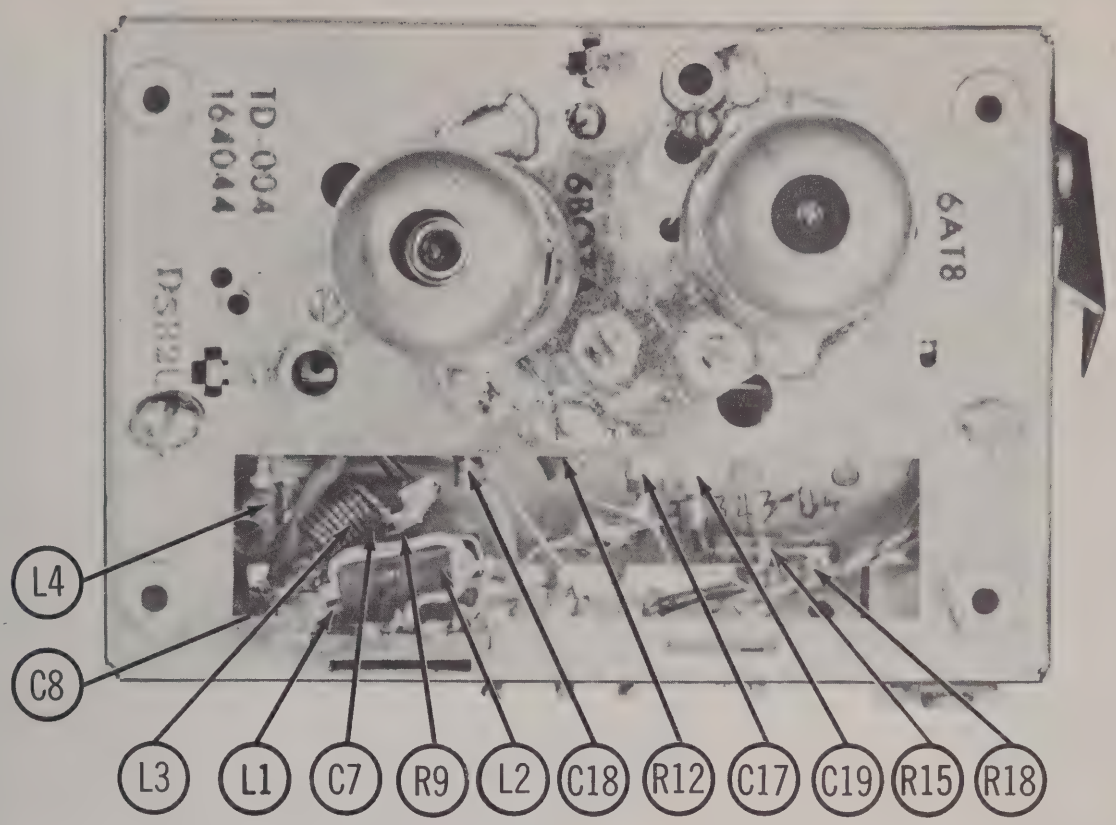
ITEM No.	TYPE	RATING	REPLACEMENT DATA: Stromberg-Carlson PART No. FUSE	Stromberg-Carlson PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	N	1/4A 125V	128042	128072			N 1/4	HO to 3/10

CRYSTAL DIODES

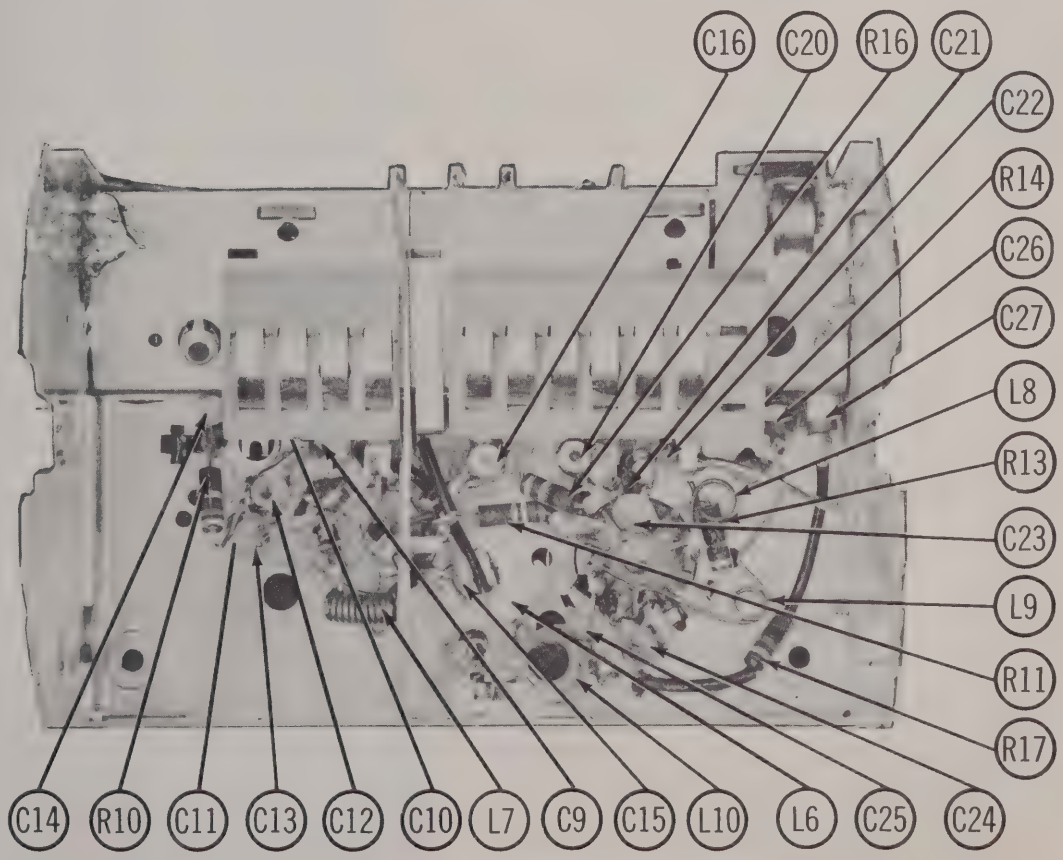
ITEM No.	ORIG. TYPE	REPLACEMENT DATA: Stromberg-Carlson PART No.	SYLVANIA PART No.	NOTES
M2	1N64	162219	1N60	Video Det. (Clip in)

MISCELLANEOUS

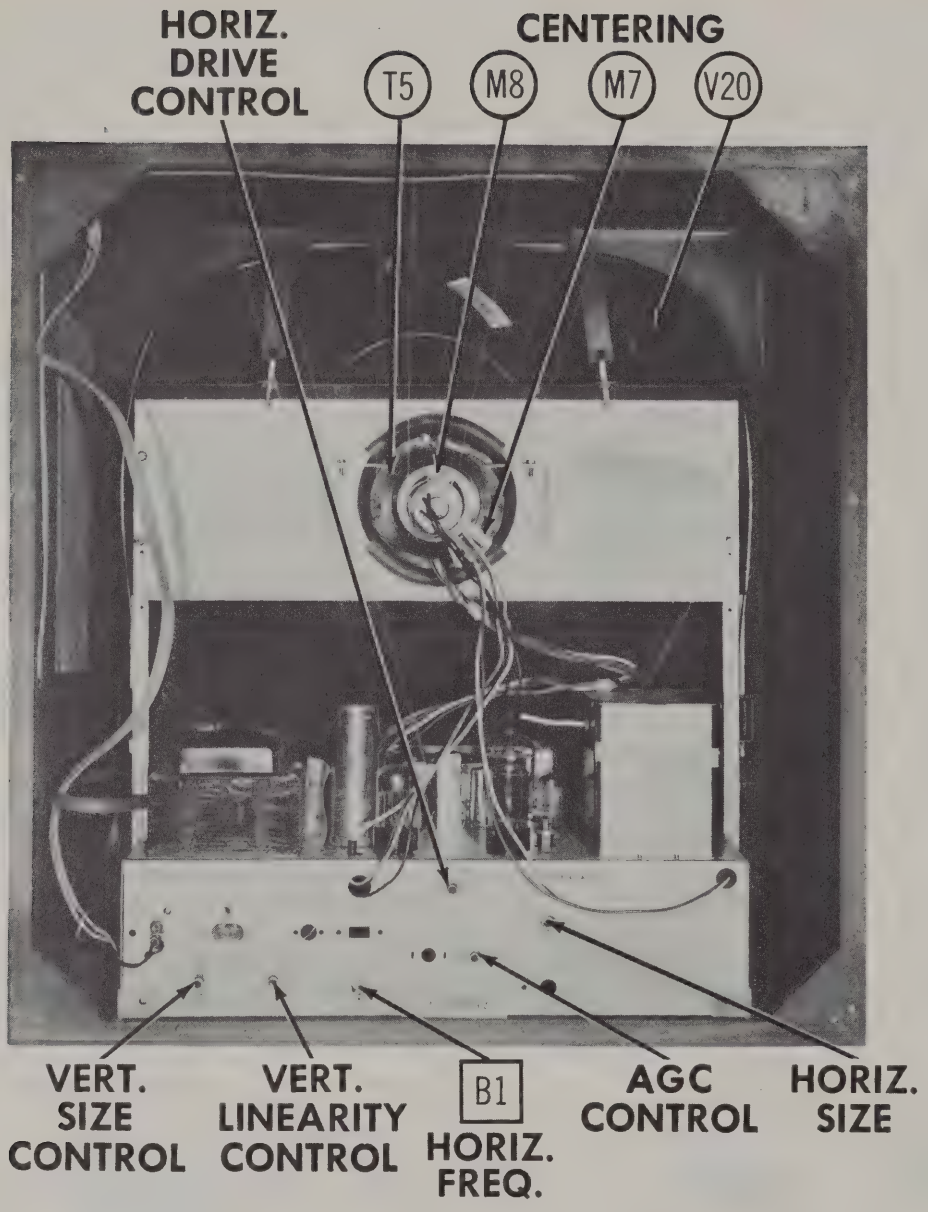
ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M3	Dial Light	137010	#46
M4	Tuner	164044	VHF-Chassis KH-21A, KV-21A
M5	Tuner	164040	VHF-UHF Combination-Chassis KH-22A, KV-22A
M6	Video Det. Assy.	114458	Includes M2, Coils, and Capacitor
M7	Centering Device		Part of Deflection Yoke (T5) Rear Cover
M8	Ion Trap	114778	
	Cabinet	108517	TQ Models
	Cabinet	108518	TM Models
	Cabinet	108522	TB Models
	Cabinet	108514	HM and HE models
	Cabinet	108515	HB Models
	Cabinet	108526	HCM Models
	Cabinet	108527	HCB Models
	Cabinet	108565	HCE Models -Marlite
	Cabinet	108534	HM Models-Marlite
	Cabinet	108535	HB Models-Marlite
	Cabinet	108507	HCM Models-Marlite
	Cabinet	108508	HCB Models-Marlite



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.	Adjust the horizontal drive control for best compromise between brightness and horizontal linearity.
Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.	Adjust the horizontal size (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

RETMA MEMBER
RADIO ELECTRONIC TELEVISION MANUFACTURERS ASSOCIATION

TRUETONE MODEL D5536A

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TRUETONE
MODEL D5536A

TRUETONE
MODEL D5536A

TRADE NAME	Truetone Model D5536A
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	AC Operated Phono Amplifier with 3 Speed Automatic Record Changer
TUBES (Four)	Types 12AV6 AF Amplifier, 12AV6 Phase Inverter, (2) 50L6GT Output
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .365 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT 28A198-SEE SIMILAR V-M MODEL 954B-PHOTOFACT SET #302-FOLDER #12

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TRUETONE
Model D5536A

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AV6	
V2	Phase Inverter	12AV6	
V3	Output	50L6GT	
V4	Output	50L6GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150	45X430	AFH3-13	C012	FP311. 67	TM-804020-150	T-055	
B	▲40	150							
C	10	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.047	200	RCP10W2473M	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C3	.047	200	RCP10W2473M	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C4	.0047	600	RCP10W4472M	SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C5	.022	200	RCP10W2223M	BPD-02	DD-203	CUB4S22	817-02	PT4122	2TM-S22	
C6	500		47X508	SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C7	.047	200	RCP10W2473M	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C8	.022	200	RCP10W2223M	BPD-02	DD-203	CUB4S22	817-02	PT4122	2TM-S22	
C9	.022	200	RCP10W2223M	BPD-02	DD-203	CUB4S22	817-02	PT4122	2TM-S22	
C10	.047	200	RCP10W2473M	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C11	.01	200	RCP10W2103M	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C12	.047	200	RCP10W2473M	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C13	.18	200	RCP10W2184M							

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	TRUETONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	200KΩ	½	40X408	AB-51	A47-250K-Z	Q13-139	U-44	Bass
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A.
R2A	50KΩ	½	40X409	AB-34		Q14-123	U-34	Treble
B	Shaft		Not Req.	AK-4		Not Req.	Not Req.	Attach to R2A.
R3A	1Meg	½	36X394	ABT-71	A47F5-1Meg	Q19-137X	UT-443	Loudness, Tapped at 500KΩ
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R3A.

RESISTORS

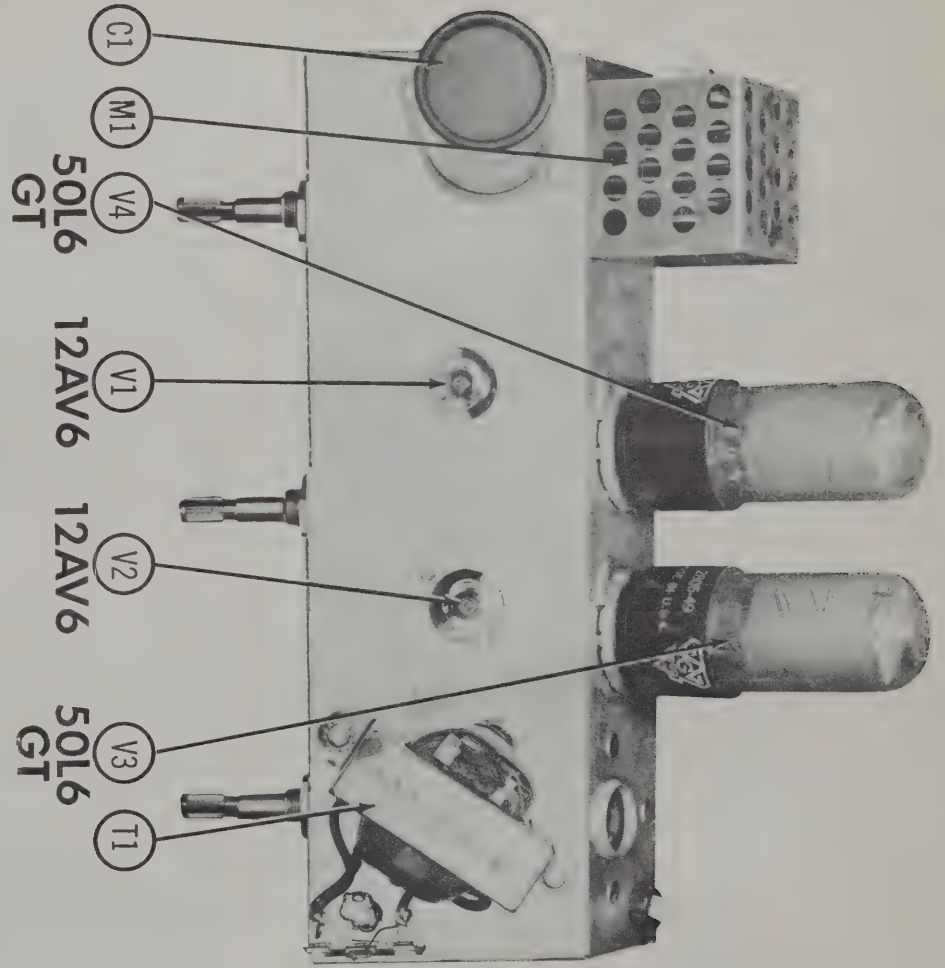
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	TRUETONE PART No.	IRC PART No.	NOTES
R4	68KΩ		B85683	BTS-68K	
R5	10Meg		B85106	BTS-10Meg	
R6	2700Ω		B84272	BTS-2700	
R7	15KΩ		B84153	BTS-15K	
R8	150Ω		B85151	BTS-150	
R9	220KΩ		B84224	BTS-220K	
R10	10Meg		B85106	BTS-10Meg	
R11	220KΩ		B84224	BTS-220K	
R12	470KΩ		B84474	BTS-470K	
R13	12KΩ		B84123	BTS-12K	
R14	68Ω	2	D84680		
R15	470KΩ		B84474	BTS-470K	
R16	15Ω		B85150	BTS-15	
R17	100Ω	2	D84101	BTB-100	
R18	22KΩ		B85223	BTS-22K	
R19	17Ω	3	43X383		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2. 5KΩ	3-4Ω	51X177-A	Z1005 ①		A-3823			① Drill one new mtg. hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	TRUETONE PART No.	QUAM PART No.	RCA TYPE No.	
SP1	6½"	PM	3-4Ω	12A534	6A15	224S1	
SP2	3½"	PM	13Ω	12A535	3A15T		

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	TRUETONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.107A	66X15	1005A	RS150	6S150	5P1	150	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	TRUETONE PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2	55TJ	55-T	GD-J	47	0-1 or S-1 and 0-3	

ASTATIC AND ELECTRO VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

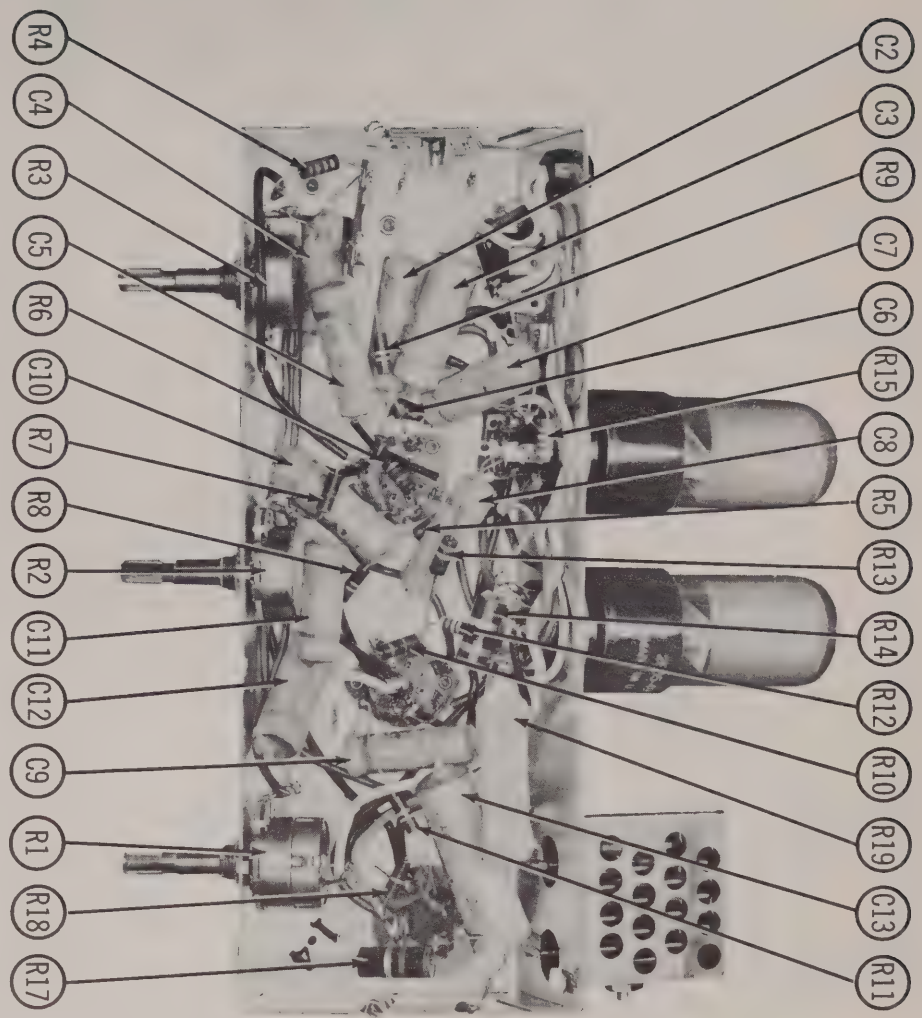
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	TRUETONE PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M3		* A-72 or † A-71 or ♦† A-71SD or ♦ A-71D	† AC-446 or †♦ AC-446D1 or ♦† AC-446D2 or ♦ AC-446D	† W-8TPS or ♦† W-8DS or ♦ W-8TPD	* Metal † Jewel ♦ Diamond

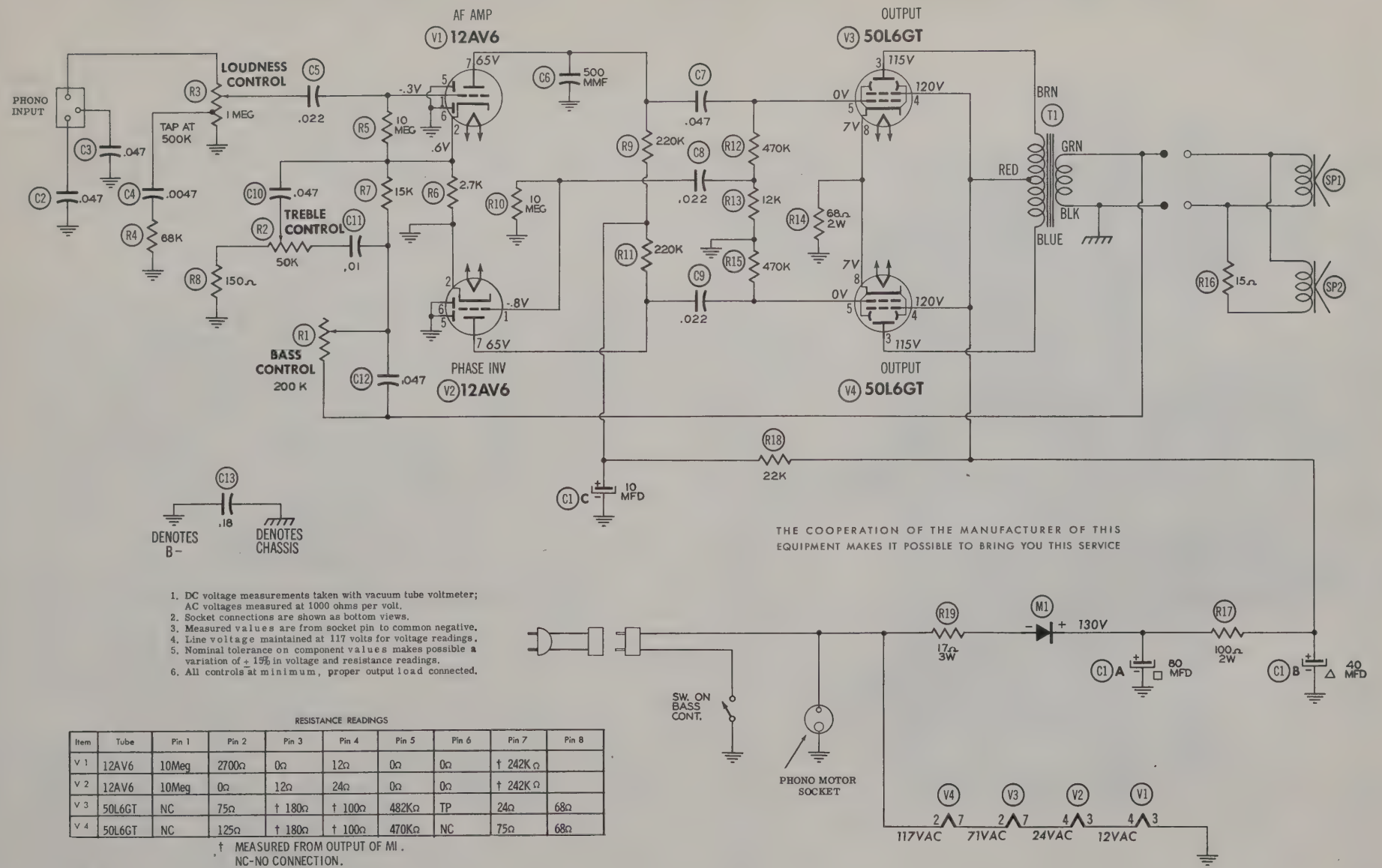
MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
	Knob	10A867-1	Control (3 used)

CHASSIS—BOTTOM VIEW



TRUETONE Model D5536A



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12AV6	10Meg	2700Ω	0Ω	12Ω	0Ω	0Ω	† 242KΩ	
V 2	12AV6	10Meg	0Ω	12Ω	24Ω	0Ω	0Ω	† 242KΩ	
V 3	50L6GT	NC	75Ω	† 180Ω	† 100Ω	482KΩ	TP	24Ω	68Ω
V 4	50L6GT	NC	125Ω	† 180Ω	† 100Ω	470KΩ	NC	75Ω	68Ω

† MEASURED FROM OUTPUT OF MI.
NC-NO CONNECTION.
TP-TIE POINT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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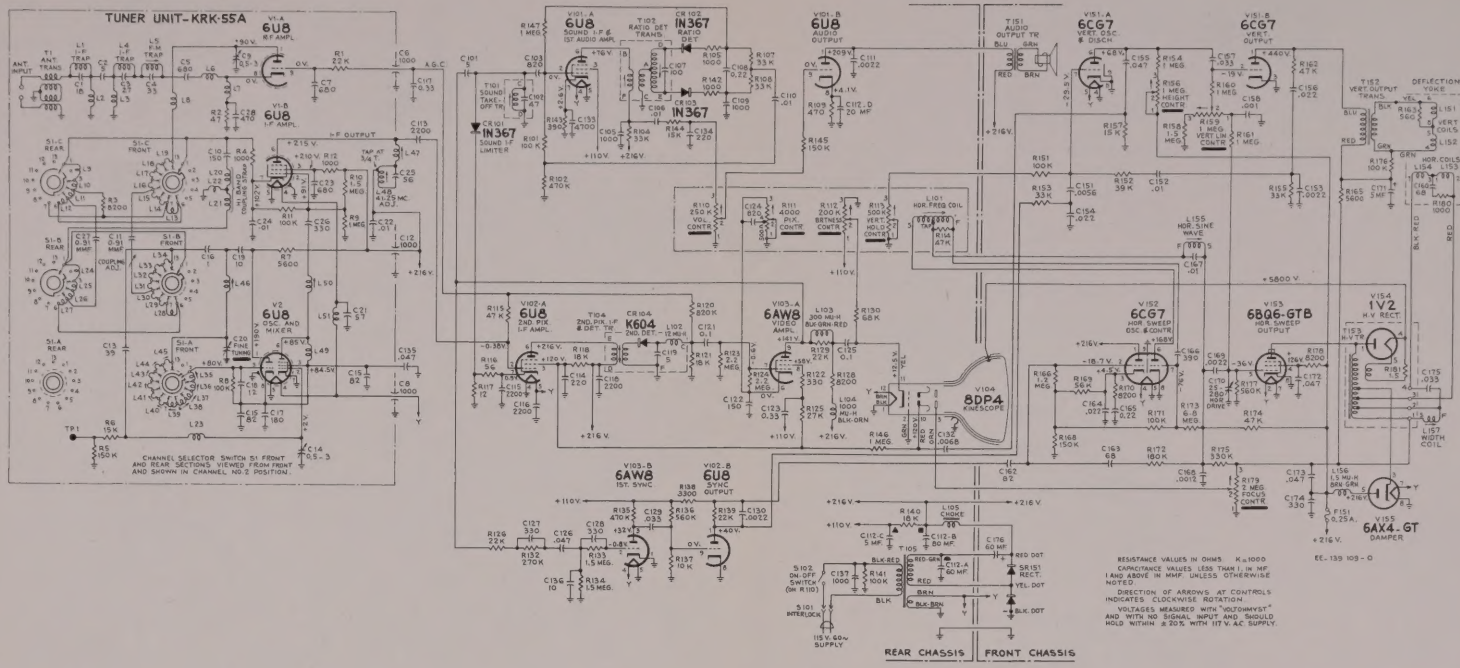
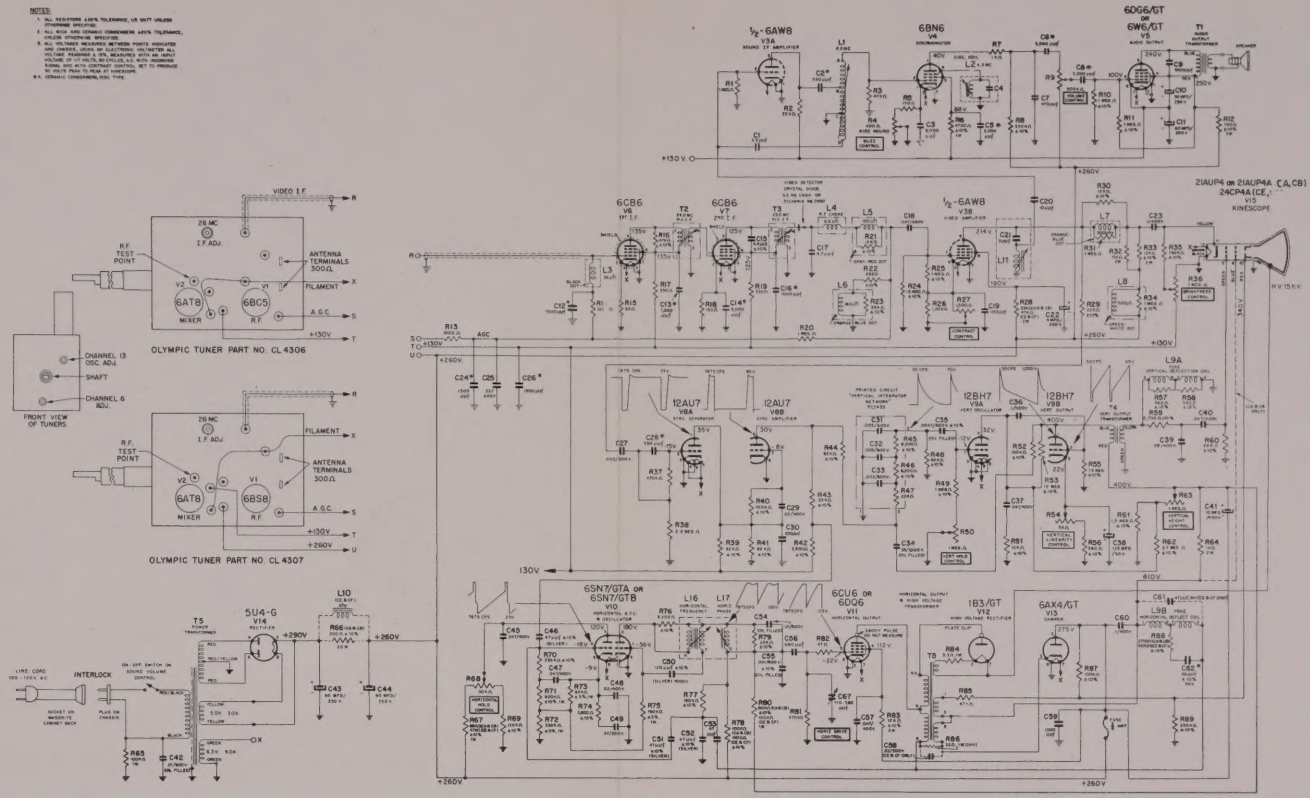

TUNER UNIT-KRK-55A
CHANNEL SELECTOR SWITCH S1 FRONT AND REAR SECTIONS VIEWED FROM FRONT AND SHOWN IN CHANNEL NO. 2 POSITION.
REAR CHASSIS
FRONT CHASSIS
RESISTANCE VALUES IN OHMS K=1000
CAPACITANCE VALUES LESS THAN 1, IN MF. 1 AND ABOVE IN MMF. UNLESS OTHERWISE NOTED.
DIRECTION OF ARROWS AT CONTROLS INDICATES CLOCKWISE ROTATION.
VOLTAGES MEASURED WITH "VOLTOHMYST" AND WITH NO SIGNAL INPUT AND SHOULD HOLD WITHIN ± 20% WITH 117 V. A.C. SUPPLY.
EE-139 109-0

RCA MODELS

8-PT-7030 (Ch. KCS100B)
8-PT-7031 (Ch. KCS100B)
8-PT-7034 (Ch. KCS100B)

Schematic Courtesy Radio Corporation of America


NOTES:
1. ALL RESISTORS ±10% TOLERANCE, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN MFD. CONDENSERS ±20% TOLERANCE, UNLESS OTHERWISE SPECIFIED.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND CHASSIS, USING AN ELECTRONIC VOLTMETER ALL VOLTAGE READINGS ± 15%, MEASURES WITH AN INPUT SIGNAL OF 1000 MICROVOLTS A.C. WITH 1000KC/SEC TUNING AND WITH CONTRAST CONTROL SET TO PRODUCE NO VOLTS PEAK TO PEAK AT KINESCOPE.
* = CERAMIC CONDENSERS, DISC TYPE.
1/2 - 6AW8
6BN6
6DG6/GT OR 6W6/GT
6CB6
6CB6
1/2 - 6AW8
21AUP4 or 21AUP4A (CA,CB) 24CP4A (CE,) KINESCOPE
12AU7
12AU7
12BH7
12BH7
6SN7/GTA OR 6SN7/GTB
6CU6 OR 6DQ6
1B3/GT
6AX4/GT
5U4-G
OLYMPIC TUNER PART NO. CL 4306
OLYMPIC TUNER PART NO. CL 4307
FRONT VIEW OF TUNERS
INTERLOCK
+130V
+260V
+290V
+410V

OLYMPIC MODELS

1CA20	(Ch. CA)	1TA10	(Ch. CA)
1CB21	(Ch. CB)	1TB11	(Ch. CB)
1DB17	(Ch. CB)	4CE15	(Ch. CE)
1KA40	(Ch. CA)		

Schematic Courtesy Olympic Radio & Television Inc.

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